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SOIL conservation

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August 1971, Vol. 37, No. 1

This month SOIL CONSERVATION takes a look at young people and their interest in conservation. The lead article is an account of how an outdoor classroom in the state of Washington encompasses all levels of education. The centerspread features Davenport's nature center for handicapped children, which is engendering in the children an appreciation of beauty and of nature. A photo article by a young lady from Arizona shows that young people, given a starting point for thought and action, are heading in the right direction. Other articles: a mobile lab brings environmental education to Milwaukee's ghetto schoolchildren; college students in West Virginia working their way through school and picking up an education in conservation at the same time.

COVER: Two students at Ohio's Mohican School (see p. 19) examine a crawfish with help from their teacher, Miss Susan Koon.

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Working with young America

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

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"Walk-up-and-kick-um"

by Jan Curtis
Information Division, SCS
Washington, D.C.

Walk-up-and-kick-um may not be the exact Indian pronunciation, but it's how the kids pronounce "Wahkiakum," the name of the school district in southwestern Washington where language arts is only one of the subjects studied in the tall timber and along the sparkling creeks of a 100-acre classroom.

Involvement isn't an Indian word, but it explains how this outdoor classroom was developed by the people of Wahkiakum County in less than 2 years and with only $2,-100.

Community involvement began in 1969 when Bob Webb, district conservationist for the Soil Conservation Service in Wahkiakum County, suggested to the school board that 100 acres of school land, then being used only by vocational agriculture students for forestry studies, could be developed into an outdoor classroom for the elementary school and the high school in the small town of Cathlamet. These two schools serve two-thirds of Wahkiakum County.

Webb's idea caught the imagination of school board members; but school district funds were low. Webb believed, however, that the people in the community would be willing to help in planning and developing the outdoor classroom.

He was right. An advisory committee made up of representatives from the state Department of Natural Resources, Crown Zellerbach (the major lumbering industry in the county), the state Department of Game, and the Wahkiakum Soil and Water Conservation District enthusiastically joined with school officials and teachers in preparing a plan for developing the 100-acre classroom.

Then, with backing from citizens, faculty, and the school board, and with a $1,800 federal grant from the Cowlitz-Wahkiakum In-Service Education Center and $300 from the state Soil and Water Conservation Committee, the project was ready to go beyond the planning stage.

Vocational agriculture students cut, sawed, split, hammered, and nailed and brought an Indian longhouse into existence for use during inclement weather. Crown Zellerbach donated the cedar logs, and elementary students, through research, furnished the design for the longhouse.

The Department of Natural Resources set up two outdoor restrooms near the longhouse and donated the sign that marks the entrance to the 100-acre classroom.

The nearby Clark-Skamania Soil and Water Conservation District loaned its trail-building machine to the vocational agriculture students for use in constructing four loop trails. The vo-ag students also helped dig soil-profile study pits, construct a series of ponds for water studies, and prepare a resource inventory map of the site. And they supervised a general cleanup of the area after construction was finished.

The vo-ag students and their teacher, Robert Kerstetter, and the Future Farmers of America chapter are given much of the credit for the development of the classroom. Fred Beck, science teacher at Wahkiakum High School and coordinator of the outdoor classroom activities, claims that their work and cooperation brought the outdoor education program into full swing years sooner than expected.

Pre-schoolers and first graders use a scaled-down version of the 100-acre classroom—a minitrail next to the school buildings. The trail leads through a strip of trees 150 feet wide, past a soil-profile study pit, and along a creek.

The minitrail is also popular with second graders, who are encouraged to use their imaginations as well as their textbooks in identifying plants. Such names as "hairy fan" for ferns, "stickly bush" for holly, and "Mr. and Mrs. Pointer" for fir cones show up in their creative writing.

Creative writers in one of the third grade classes wrote a poem about "Father Fir," the giant 500-year-old tree that stands in the center of the outdoor classroom. The poem tells how Father Fir's children and grandchildren are growing up around him on land formerly used for pasture. The music teacher set the poem to music.

Fifth graders use the outdoor classroom for environmental studies. They do creative writing and research papers, and they draw outdoor scenes using materials found on the ground as their art supplies.

Sixth, seventh, and eighth graders make use of the outdoor classroom through comprehensive science programs.

High school biology classes use the classroom as an open-air laboratory for water, animal, and plant studies. The students undertake an individual study of biotic communities. Each student ropes off his own area, studies it thoroughly for 5 or 6 days, and concludes his studies with a research paper.

The FAA chapter makes wood products as part of a timber management and money-making effort. These students have taken on the continuous task of clearing salmon berries and other undergrowth from the trail system.

One of the four trails in the outdoor classroom leads through mature timber and along a major stream that forms the classroom's northwest boundary. A second trail leads from the longhouse to a fishpond. A third features "Father Fir," a shallow pond, and an outdoor "living room"—a small secluded clearing that has soft, green, moss-covered "sofas" and "chairs." A fourth trail leads through an area where students have planted 2,500 trees in the past 15 years.

Community involvement in the classroom is still strong. Resource specialists in the area conduct a yearly "conservation day" for students, with sessions on soil conservation, fire fighting, and tree diseases.

The advisory committee, with Mrs. Norma Artiz, a third grade teacher, as chairman, is working with all the teachers and students in planning ways of using the outdoor classroom more fully. Four students now serve on the committee.

For its leadership in the outdoor classroom project, the Board of Directors of Wahkiakum School District 200 was named one of 12 regional first-place winners in the 1971 National School Board Awards. The $500 cash award will be used to further develop the outdoor program.

Wahkiakum is Indian for "tall timber," a good description of the place where Chief Wahkiakum and his Cathlamet people once lived, and where today students are learning what it means to live in harmony with nature. ♦









The objective of the Wahkiakum outdoor classroom in Cathlamet is poetically stated on the sign (opposite page) at the entrance to the 100-acre classroom.
(Above, left) The students cut their own trails in the outdoor classroom, using a "trail maker."
(Above) The trails and study areas are used by both elementary school and high school students.
(Left) These third graders are releasing tadpoles into a stream.

Caution — wide load

by Lynn Betts
Information specialist, SCS
Lincoln, Nebr.

Each morning, minutes before rush-hour traffic begins, a bulky mobile trailer snakes through the streets of Milwaukee to an appointed destination in the ghetto. Its route changes from day to day, but its mission is always the same.

The 10- by 40-foot trailer is a mobile environmental laboratory that brings to inner-city grade-school children outdoor education materials they would not otherwise have access to. It comes equipped with microscopes and other laboratory equipment, as well as an instructor.

Inside the lab, a student can watch microbes die from pollution, note a frog's pulse change as the temperature around it changes, and check his own reaction to overcrowding and noise pollution.

The mobile lab, tagged "wide-load education" by teachers, was Roy Swenson's idea. He is coordinator of community resources for Milwaukee schools. "Ghetto schools just don't have the facilities they need to conduct experiments, so the teachers are happy to get help," Swenson says.

Only schools in lower income, densely populated areas use the lab because it is financed primarily with federal Elementary and Secondary Education Act funds tagged specifically for these schools. The lab is scheduled according to requests made by the schools at the beginning of the year.

"Because we're cramped for space," Swenson explains, "we can't get all the equipment for a complete course into the lab at one time. So we've split the material into several units."

For 6 to 8 weeks each fall, the lab is equipped for experiments with minute plants and animals. Lab equipment is changed, and for the next 6 to 8 weeks students use microscopes to study animal adaptations to environmental changes. In spring the lab is set up to study urban environmental problems.

Fourth graders take the animal adaptation unit, fifth graders the urban environment unit, and sixth graders the microscopic study unit.

The sessions last only 1 hour so that the lab can get around to as many schools as possible. According to Swenson, 120 schools are eligible for the lab, but last year it got around to only 43 schools—10,000 students, 25 at a time, received instruction. Swenson would like to get two more mobile labs.

Harold Ryan, the SCS district conservationist in the Milwaukee area, says there are few places that can serve as outdoor classrooms for the inner-city schools. He thinks the mobile lab is a good supplement to classroom work.

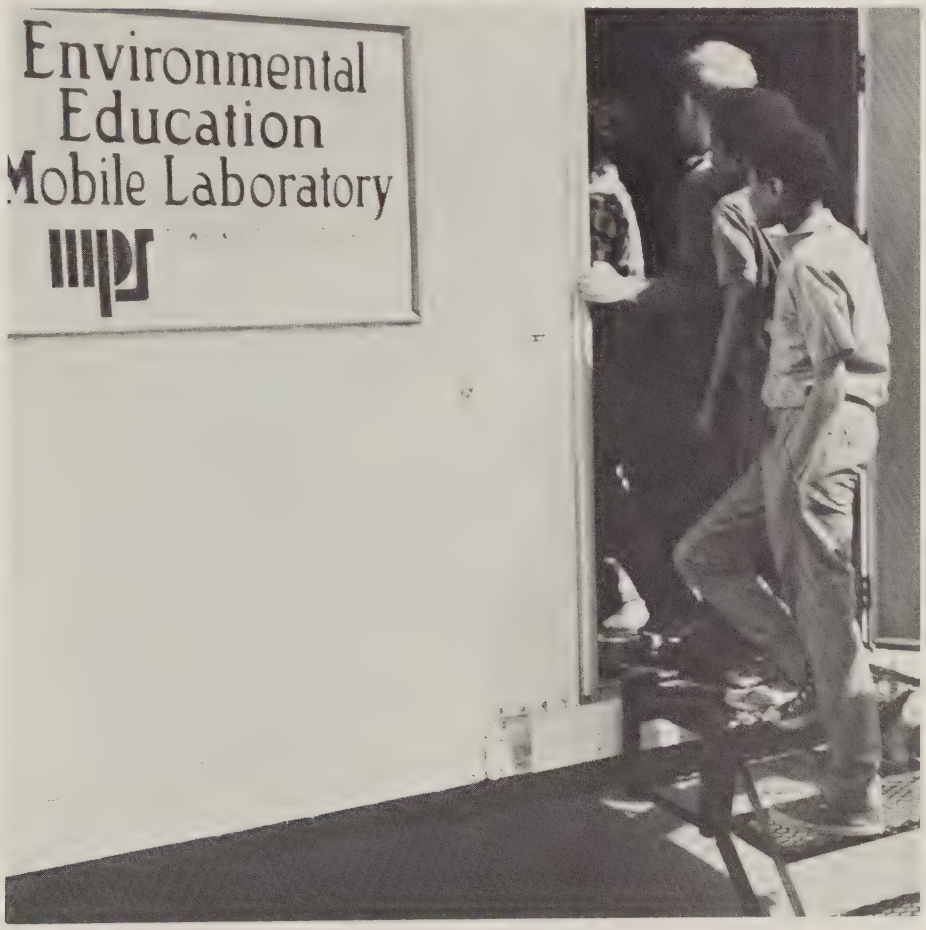
Martin Ordinans, the mobile lab instructor, states that the students' favorite course is animal adaptation. He says, "many students are fascinated just to touch stuffed animals they haven't seen before—badgers, pheasants, and weasels.

"Students enjoy the animal unit," he adds, "but perhaps the most meaningful experiment comes in the urban problems session. In it, students are given a diagram of a city block and more models of houses, churches, and parks than will fit the space. The seriousness of poor urban planning and overpopulation really hits these youngsters when they have to decide whether to give up a house or a park."

A mobile laboratory causes some administrative headaches, Swenson claims. "We've dented a couple of car fenders, for example. It didn't take long to learn to avoid heavy traffic."

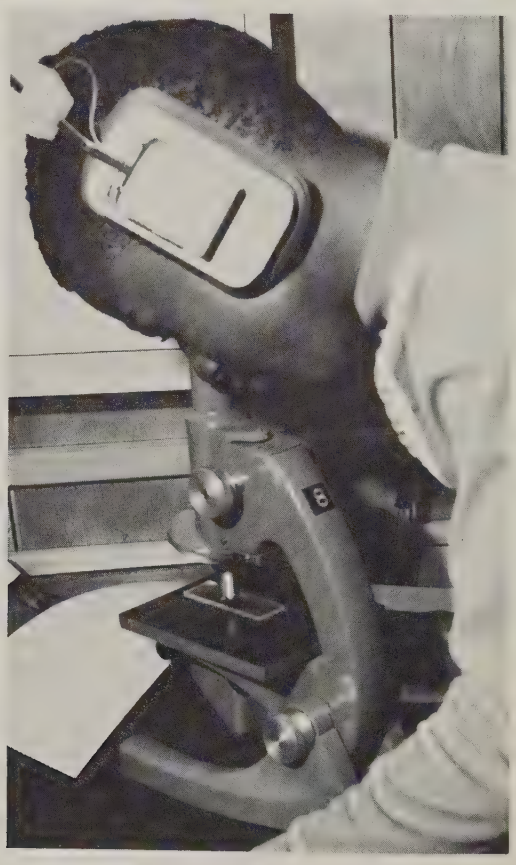
Swenson admits that he has had tense moments and probably will have more as the bulky trailer moves from school to school. But he maintains that students remember their "wide-load" education, and that makes it all worthwhile. ♦





This 10- by 40-foot mobile laboratory visits at least 43 of Milwaukee's inner-city schools each year. Last year about 10,000 students used the lab in studying about the effects of pollution and other environmental changes.





(Above) Students get taped instructions through headphones in this experiment on urban planning. When they can't fit all the buildings into the allotted space, they realize the effects of poor planning and overpopulation.
(Right) This student is studying the effects of pollution on minute animals.

E is for ecology

How much land is needed for an outdoor conservation education classroom? Children attending Mackin Elementary School in Wilkes-Barre, Pennsylvania, found that 300 square feet will do. They turned an eroding enbankment next to their school building into a nature-study area.

The children began their project by picking up broken glass, paper, and other debris from the area. Next, they asked the Soil Conservation Service for help in making a conservation plan.

As outlined in their plan, the children seeded the area to grass and planted crownvetch and myrtle in the steepest places. They planted their state tree, hemlock, and their state flower, mountain laurel, around the flagpole and privet along the sidewalk. They built birdhouses and feeder stations and placed them in trees.

James Boyle, a sixth-grade teacher at the school and the prime mover of the project, says that from this small piece of land the children's interest in conservation grew. They conducted tests to determine air pollution and analyzed the polluted waters from a nearby stream. They visited strip-mined areas and learned about mine wastes and sedimentation.

The project has the support of the school principal, Fred Crouse, the teachers, and the city school board. The Parent-Teachers Association gave $50 for seed and fertilizer.

Jim Boyle says that the mini outdoor classroom has helped the children become aware of the world around them. Ask him how much land is needed for an outdoor classroom; he will tell you, ". . . as much land as you can stand on."—FRED BUBB, *RC&D project coordinator, SCS, Towanda, Pa.*

The sixth-grade students of Mackin Elementary School in Wilkes-Barre, Pa., are posed on the 300-square-foot embankment that they developed into a nature-study area. Their teacher, James Boyle, is at the top of the embankment, on the left, and the school principal, Fred Crouse, is on the right.



Working their way . . .

by James Thorn
Information specialist, SCS
Morgantown, W. Va.

Scores of college students are getting acquainted with soil and water conservation in a special way in the Mountain State.

Eighty-four of them worked last summer for the Soil Conservation Service and the state's 14 soil conservation districts. That was the most ever in West Virginia.

More than half the students worked under the Cooperative College Work-Study Program established by the Higher Education Act of 1965. They came from a dozen West Virginia colleges and universities. Each worked a 40-hour week for wages ranging from $1.60 to $2.20 an hour.

In the 1970-71 school year, eight students worked part time—up to 15 hours a week—under the program while attending college full time.

SCS representatives regularly consult with college financial aid officers and placement officials on the work-study program. The colleges select the students for the program on the basis of need.

The colleges and universities, with federal help through the Higher Education Act, pay about 80 percent of the salaries. SCS pays the rest. Last summer, however, 13 of West Virginia's soil conservation districts paid the salaries of 20 work-study students.

Each host district enters into an agreement with the colleges that its work-study students are attending. SCS then enters into an agreement with the district.

Some students decide after one or two summers that they want to work permanently for SCS after they graduate and apply for a career-conditional student trainee appointment. Last summer, 20 students were working under such appointments.

Other students work three or four summers and then go on to careers in other fields.

Danny Akers says that the work-study program enabled him to meet his financial needs as an undergraduate and gave him the opportunity to explore the Soil Conservation Service as a future employer.

He counted as assets a fair wage, time off from work during finals, the option of working during college vacation periods, and the opportunity to work both in Morgantown, while attending West Virginia University, and in his hometown, Oak Hill, during the summer.

"Many students have to accept undesirable summer work simply because they need the money and few jobs are available," Danny reports. Under work-study, he was able to relate his college training in animal science to most of his duties.

Jeanette Shahan is another work-study student at West Virginia University. She works at the SCS state office in Morgantown, part time during the school year and full time in summer.

"At first I thought of the program only as a way to finance my education," Jeanette said, "but it has offered me much more than that." She says that what she has learned about conservation "is useful to me at the present time and will be more useful in the future."

E. T. Estlack, assistant state administrative officer for SCS, reports that many of the busiest units ask for students every year.

E. V. Wickline, area conservationist at Philippi, wanted work-study students from the start of the program.

Before the work-study program began, he had used college students as summer helpers when he was work unit conservationist at Lewisburg from 1946 to 1963. His student helpers were paid entirely by SCS. He enjoyed working with them and was pleased that they went on to productive careers—two with SCS, two with Farmers Home Administration, and several as teachers.

"By getting practices on the land, the students gain a better understanding of the soil and water conservation problems that face the country," Wickline said. He believes the lessons learned are remembered regardless of subsequent careers.





As for work-study, he said, "These young people are willing workers, and they're capable and eager to learn. They definitely help keep a work unit in top production."

Dr. David Smith, head of the Forest Technology Division of Glenville State College, claims that the variety of work offered by SCS appeals to his students. "The more opportunities there are to do different things, the better they like it."

Kenneth Malone, a professor of agriculture at Potomac State College, says that the experience brought back to school by student workers benefits his entire class. He finds the latest information from SCS field personnel, as relayed by his students, enlightening to him.

From the farm pond to the college classroom—and beyond, in their careers—the college students working in conservation can take with them responsible and knowledgeable attitudes about natural resources and the environment. ♦

(Top) Ernest W. Ashcraft, SCS conservation technician at Charleston, W. Va., shows two student workers how to check the elevations on a farm pond. Holding the rod is Robert Elmore, work-study student; operating the dumpy level is a student trainee soil conservationist, Gary E. Pullin.
(Bottom) Barbara Keaton, a political science major at West Virginia University in Morgantown and an SCS student trainee at Beckley, W. Va., works on plans for revegetating surface-mined land.

Birds and Bees and Flowers and Trees

by Herb Davison and Lynn Betts
District conservationist, SCS
Davenport, Iowa;
Information specialist, SCS
Lincoln, Nebr.

Davenport loves children—children in wheelchairs, children on crutches, children wearing braces. This Iowa city has designed a nature-study center especially for them.

The 6-acre center, now in its second year of operation, is a project in outdoor education complete with turtles, frogs, birds, and snakes. It even has its own patch of poison ivy.

The center is located behind Fairmount School, which houses both a center for children with learning problems and a preschool for children with cerebral palsy.

Dr. Paul Staskey, research director for the Muscatine and Scott counties school system, which includes Fairmount, estimates that 1,000 physically, mentally, or socially handicapped children from a 5-county area visit the center every year. Boy Scouts and other groups are permitted to use the center on weekends and at other times when handicapped children are not using it. Dr. Staskey says that he wants teachers, students, and other visitors to the center to return home with ideas on how they can develop similar areas.

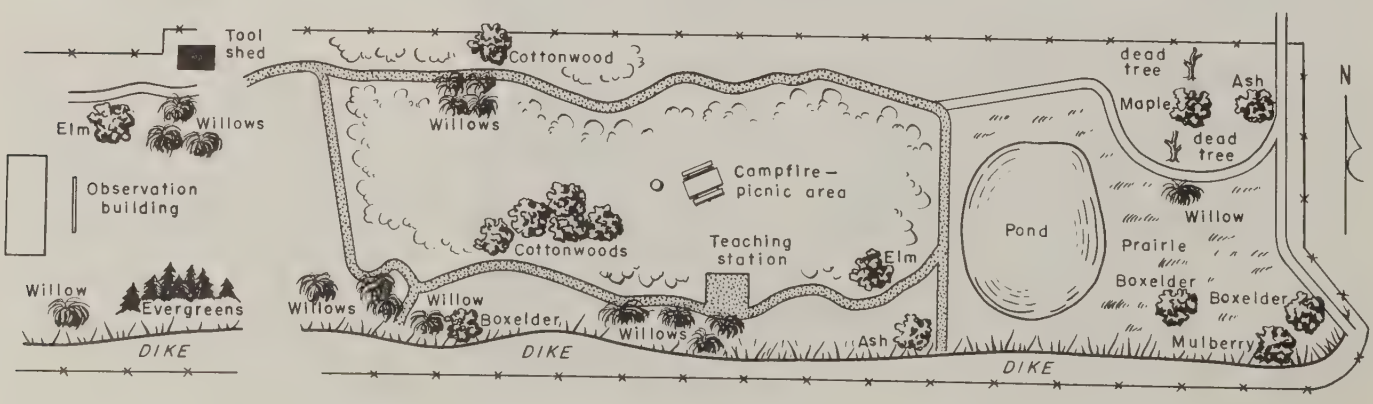
Plans for the center were started in 1969 when $87,000 in federal funds was offered through an Elementary and Secondary Education Act (ESEA) Title III grant. The money is to be used over a 3-year period for educational materials and a nature observation building.

Local people took it from there. Community Health Services, Inc., donated the land. United Community Services pledged $100 annually for maintenance. The city of Davenport allowed the use of a 125-foot strip of city property. The United Cerebral Palsy Association of Scott County pledged more than $1,300.

Volunteers from local organizations did most of the work. Davenport Jaycees blazed a trail for the cement path. They were followed by 14 Marine reservists and 7 cement finishers from Local Union 544. A local Navy Seabees unit offered more young muscles.

Builder's Cement Company of Davenport opened its plant on several Sundays and provided a truck and driver to deliver cement. Boy Scouts, members of the Wheel and Canvas Club, and local members of the National Campers and Hikers Association planted trees and shrubs donated by the Scott County Conservation Board. Girl Scouts served lunch to volunteer workers.

(Below) Diagram of Davenport's nature center for handicapped children. The 6-acre center is on the southwest edge of the city. (Center) Some of these children probably had never seen a bird's nest. The center serves children from a 5-county area. (Right, top) Several platforms were built off the cement path so that the children can stop to rest or bird-watch. (Bottom) A conservation plan for the nature center included this 3-foot deep pond, which was designed by SCS.



and Kids







Many other organizations and businesses offered their services, including the Scott County Soil Conservation District and the Soil Conservation Service. SCS helped school officials with a conservation plan for the nature center and the design for a 3-foot deep pond.

The center has a section of prairie grasses, several small spaces for gardens, a small campfire-picnic area, and restroom facilities.

Volunteers didn't do all the work in preparing the center, according to Miss Clara Emlen, who was hired last fall as outdoor education consultant for Fairmount and other schools in all or part of five counties around Davenport. "Each child attending Fairmount School planted his own tree, put his name on it, and is taking care of it," Miss Emlen says.

Explaining how the use of the outdoor center can be incorporated into all areas of learning, she says, "The children can use trees for exercises in math, or collect samples of tiny organisms from the pond for study under a microscope."

Fairmount School children call Miss Emlen the "nature lady." She says, "The children are learning conservation as a way of life. They're diligently following the rule that nothing is yours to keep—it's yours to look at and put back for someone else." ♦





The nature center gives the children an opportunity to study ecosystems that ordinarily they would only read about. About 1,000 physically, socially, or mentally handicapped children are expected to use the center every year.

Photo essay:

Youth wants to show

Politicians, businessmen, homeowners, landowners, and ecologists view conservation as a serious business. They recognize conservation as necessary for future survival and evaluate it in terms of dollars and cents.

But thousands of young Americans across the nation have made conservation a personal crusade, solely from an esthetic and philosophical viewpoint. Some even take it as a moral obligation. They feel that man, who has control over his environment, has the responsibility to preserve and protect it.

Youths of all ages and from all walks of life enthusiastically participate in conservation activities. Their dynamism and vitality give spark to conservation efforts.

In every state there are youth groups who independently involve themselves in the conservation movement. From Puerto Rico to Hawaii, from elementary to college



In Lake County, California: These boys rescued fish from pools that were drying up and placed them in the Highland Springs Dam.







In Cannon County, Tennessee (above): Seventh-grade students gather roadside trash and keep their school grounds litter-free.
In Pilger, Nebraska (top, right): A teenager gets on-the-job training while working on a flood-control project.
In Tyngsboro, Massachusetts (right): High school students study soils as part of their conservation education.







In Cheney, Washington (top, left): Pruning trees is a woodland conservation practice these Boy Scouts have learned as part of their conservation training.
In Beltsville, Maryland (above): Working for the summer at the National Plant Materials Center gives teenage boys an opportunity to learn how plants fit into a conservation program.
In Martinsburg, West Virginia (left): These Girl Scouts took on an erosion-control project—preparing a roadbank for seeding.





age, these dedicated young environmentalists can be found planting trees, seeding grass, stabilizing streambanks, stocking fish ponds, improving nature trails, and picking up litter. They carry out the conservation activities they feel are important and necessary in their area.

Their zest and spirit have made conservation in America something more than a business.—CRYSTAL WILLIAMS, *SCS Phoenix, Ariz.* ♦

In DeKalb County, Alabama (above): These Boy Scouts are building a series of dams on a roadside drainage ditch to form sediment basins. The dams will help prevent gully erosion; the roadside will be planted later to fescue.
In Sumaico, Wisconsin (left): This high-school group is learning streambank-improvement techniques.



These students at the Mohican Outdoor School are completing a wood-chip step walkway and preparing the adjacent slope for seeding. Both measures will help to control erosion.

Two hats—and both are white

by Robert H. Mills
District conservationist, SCS
Mansfield, Ohio

District conservationists in Richland County, Ohio, often wear two hats. In addition to helping solve land- and water-use problems, they assist teachers of conservation education at the Mohican Outdoor School.

The Mohican School, held at the Wooster Presbyterian Outdoor Center, consists of 270 acres of rolling forest land in Worthington township.

About 2,400 students in the fifth, sixth, and seventh grades from 15 school districts in the Mansfield area attend Mohican every year. Each school district gets a week-long session at the outdoor school.

Ronald Reed, director of Mohican, says that conservation is probably the most important subject taught there. "We believe that conservation education is not merely a study of soil and water resources," says Reed. "It has to encompass all levels of education and reach students across the whole spectrum of human experience."

Reed went to the Richland Soil and Water Conservation District for help in curriculum planning, in preparing teacher workshops, and in planning specific conservation projects for students.

Soil Conservation Service people contribute to the workshops by dis-



cussing conservation projects or concepts that may be useful to the teacher.

District conservationists also help plan nature trails and special conservation activities, and they point out on-the-land conservation practices that can be brought to the attention of the students. These include grass seeding, stream riprapping for erosion control, and tree pruning. ♦

(Above) These students are examining the variety of specimens they collected on a trip to a pond.
(Below) David Tucker, instructor at the Mohican Outdoor School, and two of his students examine tall fescue seed. The young girl holds a grass seeder.



Recon . . .

Land use policy. A bill introduced by Representative Wayne N. Aspinall of Colorado is intended to establish a national land use policy. The bill (H.R. 4332) would authorize the Secretary of the Interior to make grants to assist the states in preparing and implementing land use programs for the protection of areas of critical environmental concern and of more than local significance.

Another bill (H.R. 7211) introduced by Rep. Aspinall and four colleagues would provide that public lands be made available for residential, commercial, or industrial use, including the development of self-sufficient cities and towns.

This bill advances the "dominant use" principle that was put forth in the Public Land Law Review Commission report, providing that where an area is chiefly valuable for one particular use, that use shall be the dominant use, with as many compatible uses being carried on as possible under the multiple-use principle.

Seven Georgia towns have been notified by state health department officials that their disposal-site operations violate state regulations for solid waste collection and disposal. The towns can choose either to develop a sanitary landfill or bring their disposal-site operations into compliance. Officials say that similar actions will be taken throughout the state as such violations are detected.

A Department of Ecology has been formally established in the state of Washington by act of the state legislature. In creating this new department the legislature specified that: "It is the purpose . . . to establish a single state agency with the authority to manage and develop our air and water resources . . . and to carry out a coordinated program of pollution control involving these and related land resources. To this end a department of ecology is created . . . to undertake, in an integrated manner, the various water regulation, management, planning, and development programs; the air regulation and management program; the solid waste regulation and management program; and such other environmental . . . programs as may be authorized by the legislature."

For the third year in a row, **Kalamazoo County's Conservorama** has seen a doubling of attendance by Michigan schoolchildren. Twenty-five hundred children took part on May 4 and 5 in a program at Michigan State University's Kellogg Farm, just outside Kalamazoo. The program, developed and led by the Kalamazoo Soil Conservation District, highlighted a strong year of conservation education work by the district. The event in itself symbolized the healthy marshaling of an area's natural and social resources—a basic in the conservation approach—with inputs from children, parents, and teachers, as well as from government specialists, university scientists, and Western Michigan College students who served as aides. The children didn't just tour and listen. Prepared by classroom study beforehand, they discussed conservation topics with the technical experts who manned the 12 stations of the forest, farm, and biological sections that made up the day-long conservation survey.



Crystal Williams, 21, discusses photograph layout with Bob Branstead, Information Division visual specialist, during a week of training in the Washington office this summer. Crystal, who starts her senior year in the University of Arizona school of journalism in September, is spending her third summer in the Arizona state office, helping with information work. She is a recent recipient of a grant for black journalism students awarded by the American Newspaper Publishers Association.

Review

Films

Brush Creek Bounces Back
Produced by Stuart Finley
Directed by Theodore Jones
Running time: 22 minutes
Stuart Finley Inc., Falls Church, Va.

This film presents an intrinscially interesting story, and it can bring about a better understanding of the small watershed projects that are developing under Public Law 566. Government-sponsored and privately produced in 1970, it is probably the only film presently available that covers this conservation-development approach to area planning.

About a thousand small watershed projects are now well underway. Nearly 300 others have been completed. The likelihood is strong that the program will continue to gain momentum with some 8,000 comparable watersheds throughout the country standing in need of treatment measures.

As the film shows, the Brush Creek Small Watershed Project of Mercer County, W.Va., typifies the effective application of the watershed concept to local conditions and priorities. Designed to end a severe flood problem, the Brush Creek Project has by now successfully laid the groundwork for meeting the basic economic needs of both the townspeople and farmers in the 23,000-acre watershed that includes a rapidly urbanizing center at Princeton. How it has done so is the core of this handsome documentary color film.

The film offers visual evidence of the floods that washed through Princeton as often as 4 times a year. This distressed background sharpens the impact of the movie's portrait of the new system of 13 lakes that is the heart of the project. Then there are the benefits beyond the halting of floods, as described in their own words by private citizens who cooperated in the work of the project: surplus water supplies replacing constant shortages; unusable land becoming buildable; an end to sewage in the creek with the extension of municipal services; new industry and a new school on the new land; and a lakeside park.

This film can serve as the basis for discussion and further investigation. Suitable for all ages, it is on target for groups concerned about ecological relationships and community development and for social-studies groups and classes. — HOWARD M. GOLDFINGER, *Information Division, SCS, Washington, D.C.*

Books

Agricultural Practices and Water Quality. EDITED BY TED L. WILLRICH AND GEORGE E. SMITH. *1971. Iowa State University Press. 415 pp. $7.95.*

Sediment, plant nutrients, pesticides, and animal wastes as water pollutants are viewed in this collection of papers from the conference "The Role of Agriculture in Clean Water." The 48 authors are researchers in engineering, agriculture, biology, social sciences, geology, hydrology, and other fields, including government. The editors point out that the information in this book "is probably the most factual material in one volume on the chemical and biological reactions in soils and on crop and livestock production as they may be potential contributors to the degradation of water quality."

The authors have done some excellent reporting. And they all seem to echo the same concluding thought: Agricultural products are a necessary and vital part of the nation's economy, but agricultural activities are a source of pollution. The public is demanding that past practices that have violated the environment be stopped. Therefore, it is in the best interests of the agricultural industry to help develop its own cures.— P.A.C.

New publications

A Tropical Rain Forest, a Study of Irradiation and Ecology at El Verde, Puerto Rico. BY HOWARD T. ODUM. *1970. U.S. Atomic Energy Commission, Division of Technical Information (available as TID-24270 (PRNC-138), Clearinghouse for Federal Scientific and Tech. Inf., National Bur. Standards, U.S. Dept. of Com., Springfield, Va. 22151). 9 sections, illus. $10.* Reports studies of the "Luquillo Experimental Forest," a large section of montane rain forest in the eastern part of Puerto Rico set aside 50 years ago as a national forest. This volume presents first the scientific results of the Atomic Energy Commission Rain Forest Project 1963-67 concerned with the effects of gamma irradiation on the tropical forest at El Verde. The aim of the project was to learn how a rain forest works as a system and under stress, including populations, mineral cycles, metabolism, and operations of the complex living structure, by concentrating new and old techniques and many investigators on one small area. The second purpose of the book is to provide the details for a new wave of effort at El Verde aimed at understanding complex ecosystems and their meaning for man. The forest is regarded as a metabolic community with complex energy flows and intimate interaction between the various populations. Changes in such system interactions may prove to be the most sensitive indicators of the ultimate effect of ionizing radiation on the history of a forest.

A Guide to Medicinal Plants of Appalachia. By Arnold Krochmal, Russell S. Walters, and Richard M. Doughty. *1971. USDA Agr. Hbk. 400. 291 pp., illus. $1.75.* Guide describes 126 medicinal plants of the Appalachian Region and includes a glossary, a reference list of publications, and a listing of additional source material.

Peaceful Uses of Nuclear Energy. By Glenn T. Seaborg. *1970. U.S. Atomic Energy Commission, Division of Technical Information. 156 pp., illus.* Presents a collection of speeches. The speech on "The Atom's Expanding Role in Agriculture" says that by the year 2000 the farmer will be expected to furnish food for about 7 billion people. New crops through mutations; use of radioisotopes for new crop plants; pest control; eliminating parasitic diseases in livestock; food preservation; and other applications of radiation will help farmers increase the food supply.

Sanitary Landfill Facts. By Thomas J. Sorg and H. Lanier Hickman, Jr. *1970. U.S. Department of Health, Education, and Welfare, Public Health Service Publ. 1792. 30 pp., illus. $1.* General information on one basic, acceptable, and effective method of solid waste disposal—the sanitary landfill. The publication examines the planning, design, operation, and public health aspects of these landfills.

Background on U.S. Agriculture. *1971. USDA Leaflet 491. 8 pp., illus. folder. $0.10.* Reports that farming is the nation's biggest industry, employing 4.6 million workers; that the farmer spends about $40 billion a year for goods and services to produce crops and livestock and $16 billion for food, clothing, drugs, furniture, appliances, and other products and services; and that three out of every 10 jobs in private employment are related to agriculture.

Russian-Olive for Wildlife and Other Conservation Uses. By A. E. Borell. *Rev. 1971. USDA Leaflet 517, 8 pp., illus. $0.10.* Supersedes Leaflet 292, *Russian-Olive—for Wildlife and Good Land Use.* For wildlife food and cover in the Western and Plains States, Russian-olive is best. It is useful for farmstead and field windbreaks, snow traps, gully and streambank plantings, hedgerows, and living fences.

Wild Ducks on Farmland in the South. By William W. Neely and Verne E. Davison. *Rev. 1971. USDA Farmers' Bull. 2218. 14 pp., illus. $0.10.* Supersedes Farmers' Bulletin 2144, *Managing Farm Fields, Wetlands, and Waters for Wild Ducks in the South.* In wild ducks' wintering grounds, food is the most important requirement. Flooded fields, ricefields, oak woodlands, fresh-water ponds, and brackish-water areas offer habitats for ducks. Some of the best plants for duck fields are browntop millet, corn, Japanese millet, and smartweed; watershield, naiad and southern naiad, and potamogeton for duck ponds; and widgeongrass or saltmarsh bulrush for brackish-water areas. Evaluation of some duck-food plants is presented in list form.

Mulches for Your Garden. By the Soil Conservation Service. *1971. USDA Home and Garden Bull. 185. 8 pp., illus. folder. $0.10.* Recommends using a mulch in a flower or vegetable garden to reduce soil blowing and washing, suppress weeds, keep the soil moist and cool, and add organic matter to the soil.

Economic Impact of the Crow Wing Canoe Trail, Wadena County, Minn. By Uel Blank and Sterling H. Stipe, Jr. *1971. USDA Economic Research Service ERS-467. 29 pp., illus.* A study conducted to determine the economic impact of developing the Shell and Crow Wing Rivers in Wadena County, Minn., for canoeing and related recreational activities. Discusses the results of cooperative efforts of private groups, individuals, and government agencies, including the Soil Conservation Service. The current economic impact of the trail, while not large, provides a nucleus for a developing recreation complex in Wadena County, complementing other recreational enterprises.

Lawn Weed Control With Herbicides. *Rev. 1971. USDA Home and Garden Bull. 123. 24 pp., illus.* Supersedes Home and Garden Bulletin 79, *Controlling Lawn Weeds With Herbicides.* Gives recommended treatment for controlling weed grasses, such as crabgrass and nimblewill; also gives controls for broadleaf weeds, such as chickweed, henbit, knotweed, ground ivy, and oxalis.

Meetings

August

4-6 Community Development Society, Stillwater, Okla.

8-11 National Farm and Power Equipment Dealers Association, Toronto, Canada

15-18 Soil Conservation Society of America, Columbus, Ohio
Theme: The Shape of Things to Come
Keynote speaker: Richard Vaughn, acting commissioner of the Solid Wastes Office, Environmental Protection Agency

15-19 Conservation Education Association, Ann Arbor, Mich.
Theme: Environmental Crisis: Root Causes and Opportunities for Solution

15-20 American Society of Agronomy and Soil Science Society of America, New York, N.Y.

24-26 Illinois Soil and Water Conservation Show, sponsored by the Land Improvement Contractors of America, Monticello, Ill.
Theme: Conservation, Hope for a Decaying Environment

29-Sept. 3 American Institute of Biological Sciences, Inc., Ft. Collins, Colo.

29-Sept. 3 Ecological Society of America, Ft. Collins, Colo.

September

13-15 International Association of Game, Fish and Conservation Commissioners, Salt Lake City, Utah

15-18 American Fisheries Society, Salt Lake City, Utah

19-23 National Conference on State Parks, Des Moines, Iowa

21-24 Association of Conservation Engineers, Jackson, Wyo.

26-30 Society of American Foresters, Cleveland, Ohio
Theme: Forestry in an Urbanized Society

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From the Administrator:

Working with young America

America's young people are demanding, and getting, a greater voice in public affairs. Some have found that voice by standing in the street and shouting into a television camera. Now they have obtained a more articulate voice, a constitutional amendment that lowers to 18 years the privilege of voting in our national elections. People in public life are going to have to listen more carefully than ever to what youth has to say.

In years past, we have talked a lot in SCS circles about what we can tell youth, what we can show them, and what we can teach them. Increasingly we face up to the fact that communication flows two ways and that young people have something important to say to the soil and water conservation movement.

It goes without saying that SCS and the districts have had nearly four decades of experience in conservation. But youth has energy, vitality. Service people have professional training behind them. But youth has new ideas, fresh viewpoints. SCS and the districts have organization, a structure for getting conservation work done. But youth, given enough time and sense of direction, can create new social and political structures to serve their own ends.

I think we have got to make an effort to find better ways to communicate with young people. In so doing, we would do well to remember that both the middle-aged and the young have their weaknesses. Some representatives of my generation are too prone to defend "the way we've always done things." Some youngsters, on the other hand, are too quick to reject all the experience of older hands, an attitude that can only result in their making the same mistakes that were made before.

The other day, I asked a bright young lady of 21, with a demonstrated interest in conservation, what it was she wanted from my generation. She replied that she wanted guidance on how to go about things, how to get things done. "But nobody needs to give us the go-ahead," she added. "What we want is the road map."

Perhaps the best way we can help each other in the interests of conservation is to work together on more projects. You can be pretty sure that if young people fail to find a useful role within the soil and water conservation movement, they are going to find one outside it.

Every district probably has a list of unanswered questions that can be partially answered through student research projects or through cooperative work with young people's organizations. Questions like what do local people need—and what are they getting—in the way of nearby recreation? What is the impact of soil conservation practices on fish and wildlife? Are there any rare or endangered species of bird, plant, or animal in the area? What is it young people want to learn in school about conservation?

To get answers to these questions, district supervisors and SCS technical people can provide the guidance, the "road map" the young lady requested. And young people can provide the enthusiasm, the capacity for sustained work, and the fresh outlook that can give new life to our program.

By working together on these and similar projects of mutual interest, perhaps we can get to understand one another a little better, while finding at the same time some answers to important questions.

Kenneth E. Grant

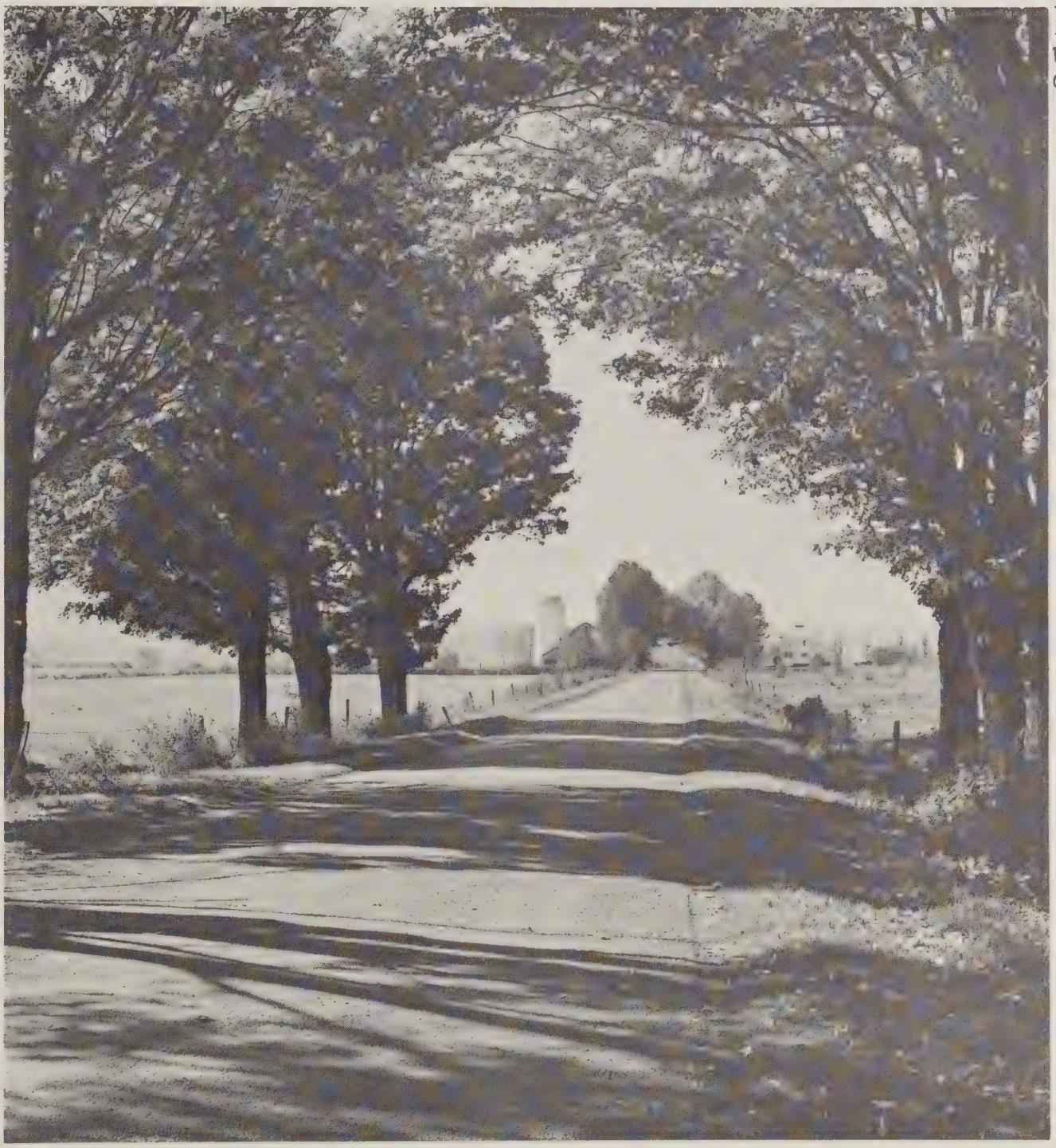
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U.S. Department of Agriculture/Soil Conservation Service/September 1971 37/2



SOIL conservation

September 1971, Vol. 37, No. 2

This month SOIL CONSERVATION reports on a variety of topics. Sellers Archer gives us an account of his recent visit to central Florida where he observed what four watershed projects have done to the area. John Cross tells us of a place in South Dakota where floodwater-detention dams replaced a "big ditch."

There's a report of a Washington cattleman's efforts to combat stream pollution, and there's an article about a summer project in Texas that puts money in teenage boys' pockets and the entire community benefits.

Last month SOIL CONSERVATION took a look at young people and their conservation activities; this month the centerspread gives equal time to oldtimers — octogenarians in West Virginia.

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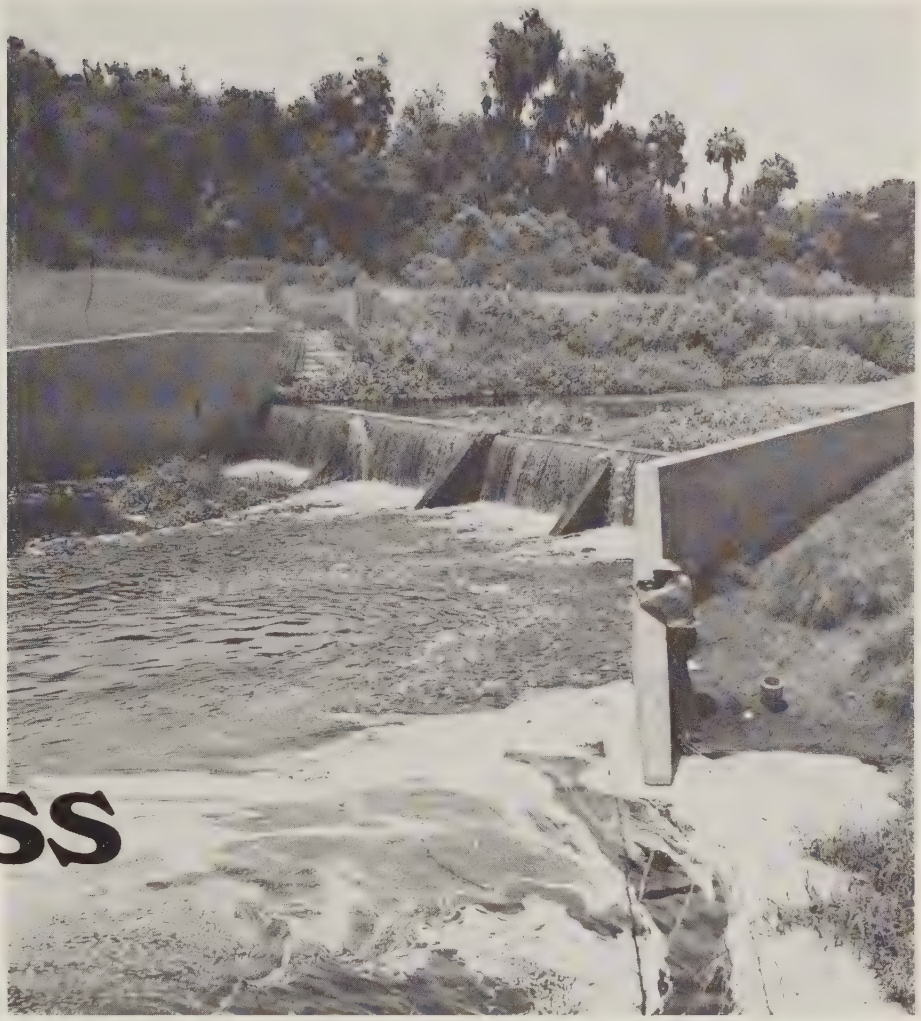
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Endless Water



Good fishing is one of the many benefits that four watershed projects have brought to central Florida's Highlands County.

by Sellers G. Archer
Public information specialist, SCS
Fort Worth, Texas

In central Florida's Highlands County, which for years had been alternately plagued by floods and drought, there is water, water everywhere—all year round.

I visited the area near the end of a spring-long drought and found lakes nearly full and water standing in stream channels. And that's the way it is now that four watershed projects are in full swing in the area. The objective is to keep as much water as possible in the natural lakes and in the 40 miles of stream channels that have been enlarged or cleaned out.

Area conservationist L. A. "Jake" Jacobsen was my host. He took me to see L. L. Holmes who was, when he retired a few years ago, the largest producer of calladium bulbs for the nation's flower gardens. His present occupation is fishing. I found him to be a practical environmentalist with a basic understanding of the area's ecology. We sat in the living room of his home on the banks of beautiful Lake Huntley, and he explained why landowners of a generation ago had drained wetlands.

"They did what came naturally —making living space for themselves. It is thoughtless to decry their errors for they had no technical assistance or the soils information that is now available from the Soil Conservation Service," he said. "And there was no watershed program to help them establish

water management for lands that were cleared.

"What we are doing today in the county's watersheds is not drainage," he went on. "We are now putting water back on—and in—the land. We want the lakes and channels to hold the maximum amount of water possible; we want to stop the wide fluctuations in water levels."

Lake Huntley is one of four natural lakes in the Lake Placid East Chain of Lakes. Floods that inundated the high-value vegetable and flower crops around this 740-acre lake cost the landowners dearly until the watershed project stabilized the lake waters at no more than 1 foot above the fixed spillway.

Lake Clay, the next in line, permits a rise of only 18 inches above the spillway. The water level in Lake Grassy, the upper lake, used to fluctuate as much as 6 feet between high and low stages. Now it rises no more than 6 inches above the fixed spillway.

Downstream from these three lakes lies Lake Istokpoga, the second largest lake in Florida. And below it lies 25,000 acres of organic soils that had been drained earlier and turned into pastures of maidencane. When the grass was grazed out, the land was used for vegetables, flowers, and other high-value crops.

Holmes told us that he bought some of that land when he went into the business of producing caladium bulbs.

"Peat, the organic soil, decomposes rapidly when exposed to air and cultivated. When dry it can catch on fire and smolder until a big rain puts it out. The fire can leave a hole 3 to 5 feet deep and several feet across. But this hasn't happened since we got our watershed project," Holmes said.

He explained that under the Istokpoga Marsh Watershed Project, ditches across the peat area were enlarged and corrugated metal water-control structures were installed at regular intervals to hold water; ditch capacity was retained to drain floodwater away. Now water seeping from the ditches keeps the water level high throughout the area. Inlet structures were also installed at Lake Istokpoga to permit recharging of the system by gravity flow.

"If a fire should be started by lightning now," said Holmes, "we could pump water from the canals and get it out in a hurry.

"But the biggest change is in the fishing," Holmes told us. "In my 25 years on Lake Huntley I have never seen so many fishermen or so many good catches of fish. Five and 6-pound bass are not unusual, and they sometimes run to 10 pounds. There are also channel catfish, bream, speckled perch, and shellcrackers. It isn't unusual to see 25 boats on the lake early in the day and many people fishing around the banks. Later the lake gets crowded with water skiers."

Wildlife has come back strong from damage done in the old drain-and-farm days. Wood ducks and wild turkeys come to Holmes' barn to feed. Sandhill cranes and white, blue, and green herons are on the increase. And so are "cow" egrets, the strange birds from Africa that are the constant companions of livestock.

Quail, cottontail rabbits, and deer had a rough time before floods were brought under control, according to Holmes. But now there are some deer and a growing population of quail and rabbits.

"What about the vanishing American alligator?" I asked C. M. Payne, a rancher living near Sebring and treasurer of the Fisheating Creek Watershed Project committee.

"As far as I know," Payne said, "and I have been here a long time, the alligator never has been rare nor endangered. Until a few years ago poachers got most of the large ones. Now there is no market for them, and they are a nuisance. We regularly lose calves and other small animals to them."

"Farmer independence" is the reason he gave for landowners in the watershed preferring to tax themselves to maintain the project, rather than letting a willing county government take over the responsibility.

Our next stop was at the office of county attorney R. P. Dunty, Jr., in the town of Lake Placid.

"Our biggest job is to keep the channels clear of excessive hyacinth growth," Dunty told us. "We spray about 280 acres of water. The spray is not damaging to wildlife. And it improves fishing and makes it possible for waterfowl to land on the channels and streams."

I asked Jacobsen about fishing in the several miles of channels in the four watersheds. "It's all good," he replied. "The channels and structures are favored over the open lakes when there is considerable water flow."

In summing up the overall effect of the watershed projects on the county, Jacobsen said, "There is no question about the widespread benefits to our county from the four watershed projects. They have added greatly to economic growth in the county and have brought recreation opportunity to the people in the area. Also, these projects have increased the people's concern for a better environment and for the protection of our natural resources." ♦





(Top) The channel on the right drops water 5 feet between Lake Huntley, in the background, and Lake Clay. The first drop structure, right foreground, controls water elevation.
(Above) This improved channel has brought beauty and recreation to homeowners along its banks.



Dog pond

by Eugene Fellows
District conservationist, SCS
Morrisville, Vt.

Ponds, a center of interest on many farms, provide a wide variety of benefits to their owners. Dr. William N. Bernhard and his wife Betsy have four ponds on their farm in Stowe, Vermont. Each pond was designed and built for a specific purpose: water supply, fire protection, recreation—and dog training.

Dr. Bernhard is an amateur Labrador retriever trainer.

The Bernhards' 375-acre farm, perched on a hilltop north of Stowe in Lamoille County, is a picturesque expanse of well-managed woodland and lush pastures, an ideal retriever training area. As cooperators with their Lamoille County Natural Resource Conservation District, the Bernhards have done considerable work to improve and protect their land and water resource.

"A few years ago, Dr. Bernhard requested SCS technical planning aid in rebuilding one of his ponds," recalls Carleton E. Piper, SCS technician. "Because he wanted to use the pond for retriever dog training, some special features had to be built into the pond. We agreed to help."

A professional retriever trainer was needed to coordinate the Bernhard ideas with SCS pond construction design, so Jake Baird of the Brome Stages Kennel, Knowlton, Quebec, Canada, was called in to help. The final design met retriever training and trial competition requirements.

The existing pond was completely drained. A bulldozer reshaped the bottom, making some areas sufficiently shallow for an average dog to run in neck-deep water. Other



areas were shaped for a 6-foot depth. Three circular islands, about 6 feet in diameter, were formed. A peninsula, 20 feet wide and 60 feet long, was shaped to extend almost to the center of the pond. Like the islands, it can serve as an obstacle in training exercises.

Total cost of the changes came to $400; the cost of the first edition of the pond ran close to the same amount.

As soon as the winter ice is gone from the pond, Dr. Bernhard and his wife start their retriever training. Puppies are not put in the water until the water is warm. A dog without previous training is taught to retrieve objects tossed along the edge of the pond or a few yards into the water. Next, he is taught to follow one of the Bernhards rowing a boat around the pond. After about a year's training, the dog can retrieve objects from the far side of the pond. As he continues to learn, the retriever is trained to follow hand and whistle signals. By the time he is 2 or 3 years old, he understands well his trainer's signals. After a few years of rigorous training, the dog is ready for retriever trial competition.

According to Dr. Bernhard, interest in retriever training is growing in the area. At least eight amateur trainers use the Bernhard pond on a regular basis, and trial competitions are often held there.

Expressing satisfaction in the success of their dog pond, Mrs. Bernhard says, "We've turned two of our most unused acres of land into a very valuable part of our farm and a center for this wonderful outdoor sport." ♦

Ronald Bouchard (above), local school teacher and retriever trainer, works his dog on the Bernhard dog pond. The three islands and the peninsula are specially planned for retriever training. Jake Baird (opposite page), a professional retriever trainer from Canada, and his retriever, Charley, run through a training exercise on the Bernhard pond.

Silver lining for Silver Creek

by John M. Cross
Information specialist, SCS
Lincoln, Nebr.

When farmers in the long, narrow Silver Creek Valley of South Dakota complain about the "Big Ditch," they don't mean the Panama Canal.

They are talking, with a disgust that has survived for 64 years, about a 1907 attempt to overcome periodic flooding along Silver Creek. That year the local landowners were assessed to pay for digging a long trench down the valley, presumably to carry floodwaters away.

But something went wrong with the engineering, because the ditch was dug on the highest land in the valley, dividing the Silver Creek bottom lands from the larger flood plain of the Big Sioux River. After heavy rains, water flowed, not into the Big Ditch, but away from it in both directions, flooding farms and a nearby railway and county road.

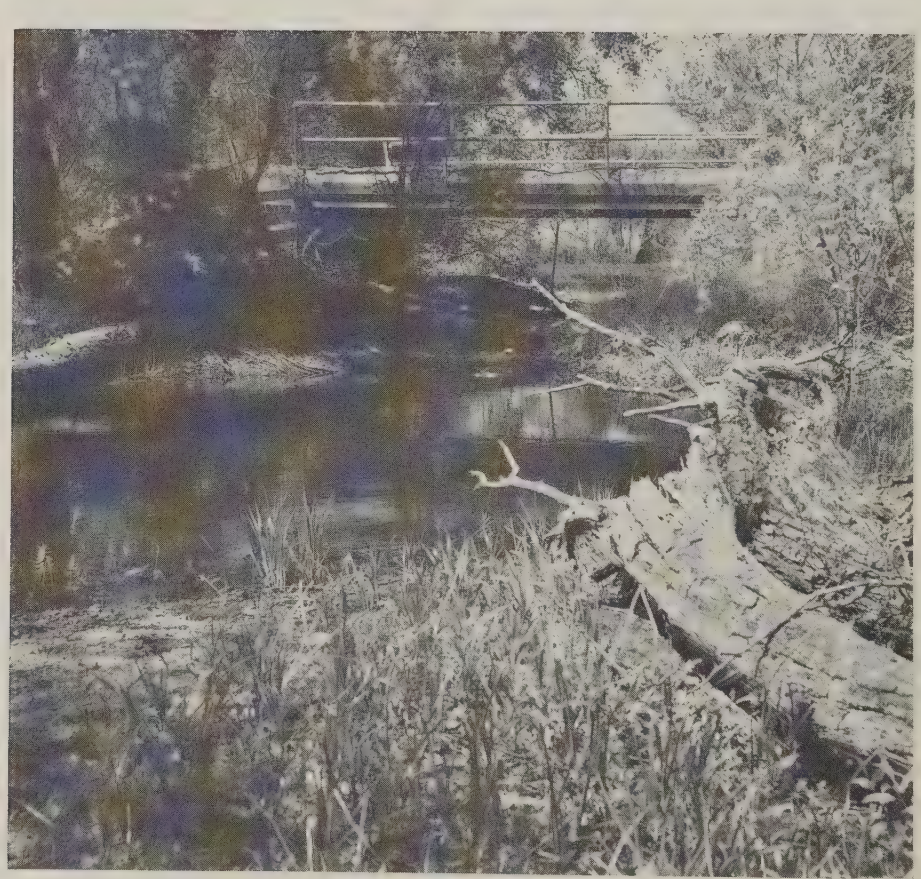
Today the ditch is grown up with trees and clogged with sediment, but it is still a bitter memory to several families of Norwegian ancestry who helped pay for it.

Now the farmers along Silver Creek are trying a different approach to flood control. They have the first watershed-protection and flood-prevention project in South Dakota planned under Public Law 566. Plans were approved late in 1956.

Gordon Volden, a fourth generation farmer and a member of the board of managers of Silver Creek watershed, expresses present-day thinking along Silver Creek in saying, "It's too bad we didn't start our conservation work earlier." He remembers catching bullheads and walleyes in Silver Creek as a boy. In those days, he recalls, the bottom was sandy and the banks were straight.

In recent years, the bottom and the banks have been covered with mud—and often with floodwater.

Floods usually come in June, when young crops look most promising. Rainfall is highest in this prairie country during the spring, and the melt from 32 inches of average annual snowfall adds to the flow.



Today's watershed plan is sounder than the Big Ditch experiment. It calls for building six floodwater-detention dams in the upper reaches of the watershed to store excess water safely until it can flow away. About 3 miles of creek channel are to be relocated, and 13 miles will be improved by clearing and snagging, widening or deepening. Some channel will be left untouched.

No channel work has been done so far, but four dams have been built—the first in 1959 and the most recent in 1962. Three of the flood pools are normally dry, but the fourth dam has a year-round pool of 13 acres and is stocked with fish.

"There's no question but that the four dams have reduced flooding from Silver Creek by about 50 percent," Volden reports.

Now the push is on to finish the project.

"About the only time you can get everybody together in this community is in church—or at a fire," says Curtis Eggers, chairman of the Silver Creek board of managers. "But I think that the people around here are ready now to go ahead and complete the work they set out to do."

He points out that hill farmers must be willing to make a few sacrifices to protect the land below. By the same token, valley farmers have to make adjustments in land use necessary to improving channels and getting the water through safely, without flooding.

Eggers said that clear understanding of the project takes time and that, in the 9 years the project has been inactive, local people have been thinking their problems through.

"Our people paid through the nose for the big ditch," says Earl Riswold, another project manager. "I can see why they would be a little slow to accept a new project."

Riswold, a third generation farmer in the valley, is among the leaders in upstream watershed treatment. He reports that parallel terraces constructed on a field in his neighborhood held a 3-inch rain last year without damage. The corn yield averaged 95 bushels an acre.

"It takes a while for people to settle differences and work together," philosophizes Riswold. "But in the long run, they are going to do what is best for themselves and their neighbors. You've just got to be patient." ♦



(Left) A mishmash of driftwood, sandbars, undergrowth, and trash choke the capacity of Silver Creek channel to carry spring floodwaters that often follow heavy rains and snowmelt.
(Right) Old Nidaros Lutheran Church, South Dakota's oldest church still in use, is still threatened by periodic floods in the Silver Creek watershed. Waters lapped at its steps in 1969.

Walnut Creek runs clean, and teenage boys walk proud

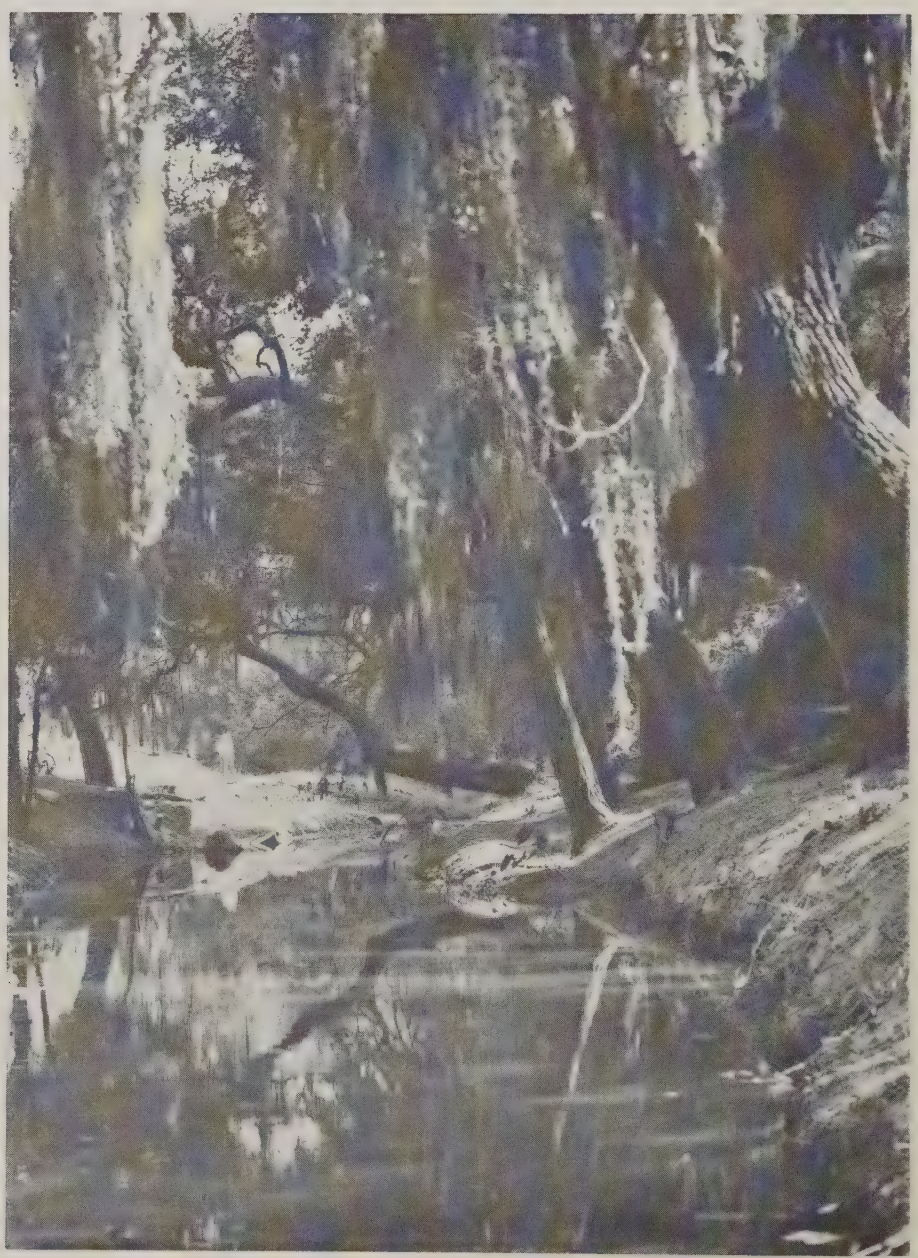
by Claude D. Crowley
Information specialist, SCS
Fort Worth, Tex.

For two summers now the Seguin, Texas, city fathers have taken an innovative approach to downtown problems. And they have proved that resource conservation and human conservation are inseparably linked—at least in Seguin.

The story centers around Walnut Creek, a meandering 2-mile long stream flowing through downtown just three blocks west of the Guadalupe County courthouse. Along the slopes of the little canyon that the stream has worn into the landscape are several springs. These springs, mostly dry or covered up now, gave the city its first name, Walnut Springs.

Oldtimers tell of swimming and wading in Walnut Creek and drinking from the springs. They recall that the streambanks were a pleasant place for a Sunday afternoon stroll under picturesque live oaks.

But as the town and the pressures of civilization grew, the creek began to fill up with old tires, cans, and assorted junk. People no longer sought the cool waters for wading. The entire creek area, well over a



mile through downtown and averaging more than 100 feet wide, grew up in almost unpenetrable brush.

The creek enjoyed a brief revival in the 1930's. It was cleaned out, and walkways and pedestrian bridges were built. But the problems of maintenance during the depression and war years overcame the improvements. Old washing machines and water heaters slid down the steep banks, soon to be wrapped in thick vines and brush.

"We got a lot of complaints about the condition of the creek," Mayor Al Koebig said. "And like most communities, we have some juvenile problems. So we tried to solve the two problems at the same time."

M. A. Goodrum, Seguin's superintendent of public works, made a study of the Walnut Creek problem early in 1970.

The Soil Conservation Service's district conservationist, Carroll Adams, helped city officials in planning for erosion control and beautification along the creek.

"We worked out a program to employ 14- to 16-year-old youths to remove the debris from the creek," Koebig explained. "This would result, we hoped, in an improved downtown environment, and it would give the young men a sense of pride, a little income, and the knowledge that they could work with the establishment.

"The city council agreed to budget $15,000 the first summer," Koebig explained. "This was all local funds—no state or federal aid. William Medley, director of the Seguin Boys Club, handled many of the details of employment. He also provided counseling to the boys."

Thirty-six boys were hired; they cleared junk and brush from about 6,280 feet along the creek. At the end of the summer, people could once again see the stately, moss-hung live oaks reflected in clean water.

"When the 1971 program was announced, we had 165 applicants," Goodrum reports. "We only employed 36 boys and had a shorter work season than in 1970. About 40 percent of the boys were repeaters from the first year. We cut weeds and generally improved on what we had done the first year.

"We have had a few problems with this program, of course," Goodrum said, "but we are sold on its value and plan to continue it with appropriate supervision and improvements."

"Naturally the first thing people see is the improved creek area," Mayor Koebig says, "but those of us who are close to the program see immediate and long-term benefits for the boys. We designed this program for the younger teenagers, thinking that at that age we could impress on them the value of work and the pride of participating in community-improving projects."

Has it worked? Such a program is difficult to measure, city officials say, but one of the more substantial endorsements comes from Captain Leroy Schneider, Seguin's police chief.

The city has retained a landscape architect, and plans are being made to convert the creek area into a greenbelt.

"And the real beginning will be the work done by these boys," said Koebig. "This experience can establish attitudes toward conservation and responsibility that will last them all of their lives." ♦

(Opposite page) The townspeople in Seguin can once again see stately, moss-draped live oaks reflected in the junk-free water of Walnut Creek—within three blocks of the courthouse.
(Below) The teenage boys working in the Walnut Creek cleanup project did not use power tools—the only motorized equipment used was the city trucks that hauled off the debris.



1,000 years of living

A district conservationist in West Virginia has just finished a series of "best sellers" for a local daily newspaper on active cooperators in the county who are 80 years old or older.

Author of the 17 articles is John Cooper, 51, an animal industry major who also worked on the staff of a college newspaper.

His stories on elderly cooperators, which ran on Thursdays on

by Hubert Kelley
Information Division, SCS
Washington, D.C.



Captions are from John Cooper's original articles.

"What a group! More than 1,000 years of living. It must be the air, the hills, or the land itself that has given the magic potion that has kept these genial gentlemen robust and strong for an average of fourscore and 6 years. John R. Hussell (left) is 89 years old. He bought his farm in 1909. He didn't become a district cooperator until he was in his late sixties, in 1951."

the front page of the *Point Pleasant Register* (circulation 7,300 plus), boosted the paper's press run by at least 100 copies on the day they appeared. Editor Robert Wingett couldn't have been happier.

"The families of the octogenarians alone could account for the increase in circulation," Cooper figured. "Most of the men have from 75 to 100 descendants, and they all wanted extra copies of the paper."

Cooper began the series with articles on four men that he knew personally and admired.

"But once the articles began to appear," he said, "local people would come up to me and ask, 'Why not do a story on my grandfather?' So the series kept growing. Before I was done, I had written an article on every octogenarian in Mason County who was a cooperator with Western Soil Conservation District and was still active in farming. The lives of these men added up to 1,457 years."

Conservation figured prominently in the stories, as did homely philosophy about the virtues inherent in farming and hard work.

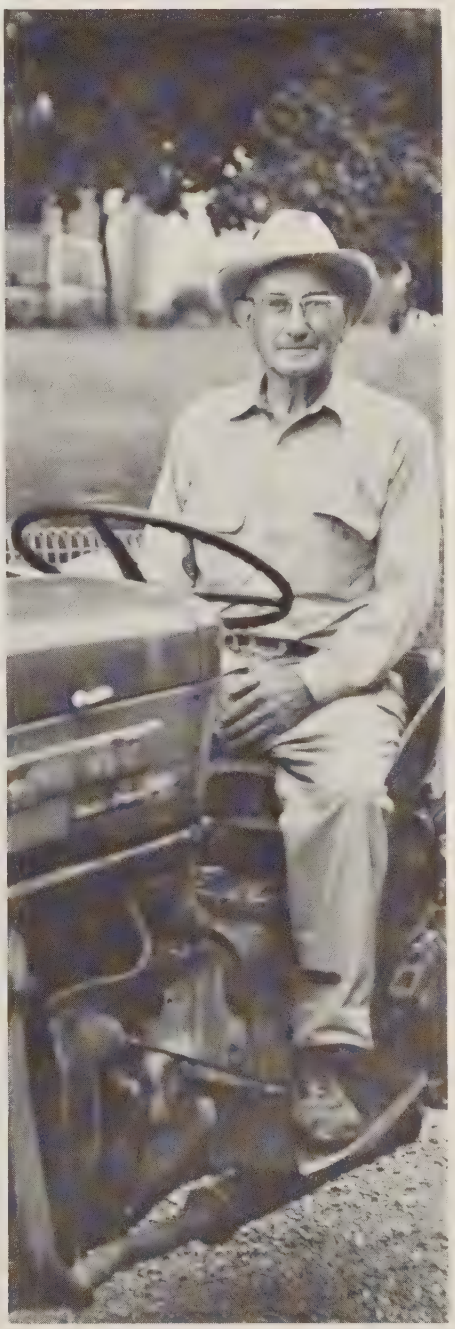
One subject, James T. Cain, 80, had just planted 1,800 locust trees on his farm. "Somebody has to plant them," Cain was quoted as saying. "I won't get the benefit of them, but somebody will."

Another farmer, 82-year-old Roy Jividen, wanted to discuss the site for a new pond when Cooper came to interview him. And an 86-year-old farmer boasted that in all his days, "I have never had a boss over me."

Cooper said that despite their longevity, most of the octogenarians had never had their names in



"All were lean and wiry, like 87-year-old John R. Sturgeon (left). There wasn't a fat one in the bunch, and most had a history of staying out of hospitals. In talking with them, I compared them to men much younger who are generally complaining about something. Not these men. They have worked hard all their lives and are proud of it. J. Everett Gills (right) at 82 years still manages and supervises two farms of about 500 acres each."



the paper before. "In some ways, they were a forgotten group of people," he explained. "Seeing the stories and their pictures in the *Register* put them right up there on Cloud 9."

The author, who admitted that he "likes to write," knocked out each article on his typewriter at home in an hour or two. He also took all the photographs, using a 4-by-5 Graphic camera.

A weekly column, "The Lay of the Land," which Cooper has been writing for 23 years, presently appears in the *Register* and in two other newspapers that serve local readers. Bits and pieces of it appear frequently in the larger dailies in Charleston and Huntington.

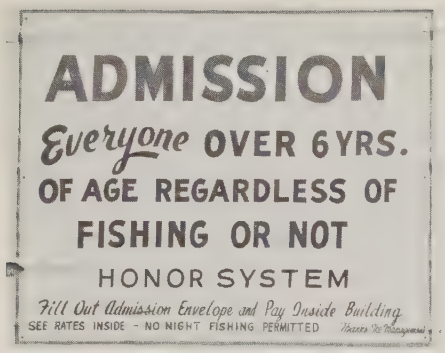
Cooper tries not to preach or editorialize in his column. "I try to stick to newspaper reporting, to talk about the people we've been working with and what they've done," he said.

Cooper's writing plans include a series on young cooperators in the county, possibly tied into the work of the Jaycees. ♦





"Sometimes we are prone to think that brains weren't invented until the 20th century, but after talking to many octogenarians, I'm convinced that people used to be as smart, maybe smarter, than we are today. 'When I became a cooperator in 1946,' said James T. Cain (top), who is 80, 'that was the last hillside I ever plowed.' John A. Kapp (right), 83, is still farming his land. 'I plow the way the land lies,' he said, 'and I turn the furrow uphill.' I asked several of these oldsters their secret for long and productive lives. More than one answered, 'Stay out of mischief and go easy on tobacco and whiskey.' "



4,000 acres of fishing

Although Gulf Coast fishing waters are less than an hour away, DeFuniak Springs, Florida, is finding that fresh water fishing can prove a lucrative tourist attraction.

Declaring itself "the fresh-water fishing capital of west Florida," the town bases its claim on 400 ponds and lakes, having a combined surface area of approximately 4,000 acres, built by landowners in the Choctawhatchee River Soil and Water Conservation District.

The area's ponds and lakes have attracted people, drawn by stories of 1-pound bluegills and 10- to 12-pound bass, from hundreds of miles away. Bell and King Lake, the largest in Walton County, has 700 acres available on a fee-fishing basis.

Mrs. Pat Potter, manager of the DeFuniak Springs Chamber of Commerce, said "The growth of fishing as recreation in this area has, in the last 10 years, brought us community income equal to a small industry with its jobs and payroll. Our economy has definitely been given a boost by conservation programs in this way, and the end is not in sight."

SCS provided technical help in the planning and layout of farm ponds and of several of the larger lakes built primarily for recreation. —JOHN T. BARNES, *project coordinator, SCS, West Florida RC&D, Bonifay, Fla., and* LEO E. STRICKLAND, *area engineer, SCS, DeFuniak Springs, Fla.* ♦



Juniper Lake contributes to the 4,000 acres of fishing in west Florida.

Pollution made him do it

by Donald M. Gladson
District conservationist, SCS
Union Gap, Wash.

Joe Stenson, cattleman, was determined to stop contributing to the pollution of Cowiche Creek which provides water for his 250 to 300 head of cattle. And he did.

Stenson has a ranch in Cowiche Valley, 12 miles northwest of Yakima, Washington. For years he diverted part of Cowiche Creek's flow through five corrals on his ranch. Livestock wandered in and out of the ditch, contributing to the pollution of Cowiche's downstream flow that traverses the Naches and Yakima Rivers before it enters the Columbia River.

Cowiche begins as a clear, cool mountain stream high in Washington's Cascade Range. It winds its way down to the 13,000-acre Stenson ranch that borders the timber and sagebrush country on the Cascade's east slope.

After reading and hearing much about pollution and other environmental problems, Stenson, a cooperator in the Hi-Land Soil and Water Conservation District for 30 years, turned to his district and the Soil Conservation Service for guidance and help. And he sought cost-sharing through the Rural Environmental Assistance Program.

Andrew Linn and Arden Jones, SCS engineers assigned to the district, devised a unique plan to eliminate contamination.

Instead of flowing down the ditch, the diverted water now is carried through 1,090 feet of 10-inch concrete pipe. At each of the five corrals the water surfaces to a round 36-inch diameter concrete weir box, spills over a baffle, and returns to the bottom of the box. It continues down the pipeline to the box in the next corral, and what isn't drunk by the cattle reenters Cowiche Creek unpolluted.

Stenson said the system works well even in winter. The constant movement of the water, falling over the baffles, keeps it from freezing. ♦



Water for cattle surfaces to the 36-inch diameter weir box in this feedlot. It then spills over a baffle (shown in the inset) and returns to the bottom of the box. A pipeline gets it to Cowiche Creek unpolluted.

Sericea lespedeza—fit for fodder

by James K. Farley
District conservationist, SCS
Halifax, Va.



Calves and beef cows on Marshal and Betty Martin's Virginia farm feed on Serala lespedeza and Kentucky 31 fescue. Martin says the Serala variety is "as good as alfalfa."

Sericea lespedeza as a forage crop?

Yes, sir, says Marshal Martin, of Halifax County, Virginia, particularly if it's the Serala variety.

Martin should know what he's talking about. In 1965, after two "rough" years as a tenant farmer in North Carolina, he returned to his home county in Virginia and bought a 149-acre farm. Most of the place was in woods; the open land was idle or grown up in bushes. The soils are somewhat droughty, highly erodible, and more suited to bright tobacco than to grain, hay, or pasture.

Martin had no illusions about the farm or the work it would take to make it pay. His on-the-farm "team" included his wife Betty, their teenage daughter Joyce, and one hired hand. He also sought help from the Halifax Soil and Water Conservation District, of which he became a cooperator, and from the local SCS office.

Martin knew that his 5-acre tobacco allotment wouldn't justify his capital investment, and he turned to cattle as a source of income. Twenty acres of his best land was stripcropped for grain and tobacco, but most of the remaining open land went into forage production—60 acres of pasture and 12 acres of hay and grassed waterways.

A 1-acre pond designed by SCS was put in for watering livestock and irrigating tobacco. It was stocked with bream and bass.

Martin decided that Kentucky 31 fescue would be an ideal base for his pasture program. But the soils are too droughty for clover, so Martin turned to sericea lespedeza for both pasture and hay because it is drought-resistant and hardy.

Sericea had been used widely in the region for wildlife food and cover and critical area stabilization, but it was not highly regarded by local farmers in pasture mixtures.

After clearing land for pasture, Martin established his fescue in the fall. He seeded common sericea the following spring, continuing until mid-July. Most of his successful seedings were made with a grain drill, but he also had good luck seeding sericea in July behind a light double disking.

About this time, Martin secured 100 pounds of the then-new Serala variety and began substituting it for the common sericea. When his pasture was established, he applied 1,000 pounds of 2-12-12 and 2 tons of lime per acre. He topdresses his pasture every 2 years with 500 pounds of 0-20-20 per acre. Today 90 percent of his stand is Serala, which is demonstrating increasing value throughout the southeastern United States as a forage crop.

A herd of 60 beef cows graze Kentucky 31 in the fall and spring. Serala sericea lespedeza is pastured in summer, with the excess growth cut, baled, and stored for winter feeding and for sale. Martin insists that the sericea hay is as good in quality as alfalfa.

Two years after he bought the farm, Martin was selected as Conservation Farmer of the Year by the Halifax District board of supervisors.

Recently, the former tenant farmer bought 51 acres adjacent to his farm. Fifteen acres of this tract has been seeded to pasture—fescue and lespedeza.

Meanwhile, Martin's daughter Joyce is making her own reputation as a farmer. She raises calves purchased from local dairy herds, an acre of cantaloupes, and 2 acres of truck crops for selling to local markets. Last year her income came within $400 of Martin's entire tobacco allotment. ♦

conservation in action

SCS pub pushes pledges

A Virginia chamber of commerce is using "Controlling Erosion on Construction Sites," an SCS publication, in a third-round effort to sell local builders on "taking the pledge."

The Chamber, which serves the town of Williamsburg and James City County, has prepared three versions of a "pledge to maintain the quality of our environment." One is directed to architects, one to developers, and one to building contractors.

Each pledge calls for erosion and sediment control, preservation of existing trees or planting new ones, trash maintenance, and avoidance of air and chemical pollution.

There is no sediment-control ordinance so far in James City County, but there has been "some talk of such an ordinance."

BUILDING CONTRACTOR'S
PLEDGE TO MAINTAIN
THE QUALITY OF OUR ENVIRONMENT

As a building contractor, I contribute to progress in this area. I am aware that man depends upon nature, that nature has made this area beautiful and that man must work with, and not against nature. I recognize, also, our obligation to our neighbors.

To this end --

I PLEDGE

A. In clearing a site, I will endeavor to remove the minimum of trees, shrubs, and other vegetation.

B. I will schedule the work so that raw earth is exposed to the elements for the shortest possible time.

C. When the construction site is large and construction schedules protracted, I will provide vegetation and/or mulching to be placed so as to minimize earth silt runoff and/or build sediment basins to avoid undesirable sedimentation of neighboring ravines, streams, rivers and lakes.

D. I will control wind-blown trash generated by my construction project to avoid visual blight on my own work site and on neighboring properties. I will provide adequate waste receptacles to keep the construction site clean and neat.

E. I will not contribute to air pollution by permitting on-site burning of trash or tires. I will avoid burning trees or timber whenever possible.

F. I will not pollute the soil with poisonous chemicals for vermin control except under the direction of a qualified and bonded expert.

Originator of the pledges is Rudolph Bares, Jr., chairman of the Chamber's Committee for a Quality Environment and an executive of the Colonial Williamsburg Foundation. Bares sought lots of help in writing the pledges, including, he said, "expert help from geologists, microbiologists, and others with the College of William and Mary."

The first mailing, to local architects and builders, went out early this year with a covering letter from Bares asking each recipient to sign two copies of the pledge, retaining one and returning one to the Williamsburg Chamber.

"We will be publicly acknowledging those who have joined us in a common concern for environmental quality," Bares' letter concluded.

"So far," Bares declares, "we have received good response from architects, moderate response from contractors, and very poor response from land developers.

"Several architects not only signed the pledge but praised us for our efforts. A number of contractors and developers signed promptly but without comment."

A short followup letter was sent in April to those who failed to respond to the first appeal, and Bares says he picked up a few more returns.

Now, he believes, it may be necessary to back up his appeal with facts about erosion control, and he selected SCS's erosion-control bulletin to help do the job.

Eventually, the Chamber committee hopes to run local advertisements, naming and thanking those who have signed pledges.—HUBERT KELLEY, *Information Division, SCS, Washington, D.C.* ♦

Everything they always wanted to know about fish ponds

Four Spokane high school students have gone beyond the routine poster display in demonstrating their concern for a cleaner environment.

Jack Rutz, Jay Kehne, Jim Piton, and Gary Smith, working with Paul Jensen, instructor of aquatic biology at Shadle Park High School, spent 4 months running a chemical analysis of farm fish ponds in the Spokane area. Their intent was to learn about water quality and management. Their efforts proved useful to trout farmers and to landowners wanting a fish pond for recreation.

The four students began analyzing water samples in February. With help from the Central Spokane Soil and Water Conservation District, they selected 17 ponds for study. Many of the pond owners already had shown interest in receiving help in managing their ponds for better fish production.

The students kept records of each pond, and as water conditions changed from winter to spring they noted changes in physical and chemical qualities, including temperature, turbidity, oxygen content at various water depths, carbon dioxide, pH, alkalinity, hardness, and hydrogen sulfide. As warm weather came, they took samples of aquatic plants, insects, and other organisms to complete the analysis of each fish pond.

Throughout the 4 months, Jack, Jay, Jim, and Gary ran their own show. They contacted the landowners, set up and followed a firm work schedule (which took up many hours of nonschool time), and provided their own transportation to pond sites. SCS biologists reviewed their work periodically in the field or over the telephone. The young men tried to work out most problems themselves, but help was available if needed.

When the study was completed, records were consolidated and put in graph form by the students. An analysis of individual ponds was given to the pond owner with recommendations for water-quality management if needed. The Soil Conservation Service is keeping the data as a guide for landowners who have problems with fish ponds.—LeRoy A. Shearer, *biologist, SCS, Spokane, Wash.* ♦

SCS biologist LeRoy A. Shearer gives guidelines on checking water quality of fish ponds to (l. to r.) Jack Rutz, Jay Kehne, Jim Piton, and Gary Smith.



A remedy for wasted water

"The adage 'Waste not—want not' is as appropriate as ever," says Basil Newton, foreman of the Humiston Corporation ranch, near Montague, California. It was this adage that prompted the ranch to construct a tailwater recovery system.

Formerly, the 517-acre ranch had only enough water for 217 acres. "When irrigation water leaves the ranch it's gone forever as far as benefiting this property," Newton said in seeking irrigation water-management aid from the Soil Conservation Service office in Yreka.

The tailwater recovery system consists of a storage facility and a pumping unit. SCS helped in designing the system and in selecting a site for the storage facility. The storage pit is 368 feet long, 46 feet wide, and 10 feet deep. It stores only about 2½ acre-feet of irrigation runoff, but by constant use

a 5-horsepower motor and pump increases the overall capacity, delivering 300 gallons of water per minute.

Nearly 990 feet of 6-inch buried pipe returns the tailwater to the irrigation system's headwaters. A division box distributes the water back into the irrigation system.

More water has been available, apparently from subsurface sources, than was expected; consequently the pump does not at any time empty the pit.

Newton plans to use the recycled water on land already under cultivation and in developing additional pasture acreage. The tailwater has already opened up an additional 48 acres to irrigation. And production of forage on the ranch has increased from 900 to 8,000 pounds per acre, an increase from 1 animal-unit-month to 9 animal-unit-months per acre.

Cost-sharing through the Rural Environmental Assistance Program helped defray the overall cost of construction.—HERBERT JACKSON, *engineering technician, SCS, Yreka, Calif.* ♦

USDA scientists tour USSR "new lands"

A USDA delegation of agricultural specialists returned this month from the Soviet Union after a study-tour of the USSR's "new lands." The 6-man group was headed by Dr. John E. McClelland, head of the soil correlation staff, SCS Regional Technical Service Center, Lincoln, Nebraska.

The purpose of the trip was to evaluate Soviet experience in bringing 100 million acres of semiarid land under cultivation, primarily of spring wheat. The new-land program in the Soviet Union is now approximately 15 years old and is centered in areas east of the Urals, the northern part of the Kazakhstan, and the southern part of Western Siberia. The trip was part of a continuing cultural exchange of USA-USSR scientists in different fields. ♦

Vacant lots for city tots

Children dodge traffic in city streets while vacant lots fill up with trash. Not in Farrell, Pennsylvania.

Duane Mohney, a local recreation consultant, with the help of district conservationist Richard Crowley developed a plan to convert a vacant lot, knee-deep in trash and cinders, into a children's playground.

The entire community rolled up its sleeves and pitched in to help. Neighborhood youngsters helped clear rubbish from the lot. The Soil Conservation Service helped with erosion problems; it supervised the covering of the entire area with a deep coating of soil. RC&D funds were obtained to purchase the lime, fertilizer, and seed needed to stabilize the area. Several boys seeded the sloping banks, and a group of oldtimers planted trees. Playground equipment, donated by a local steel firm, was installed, and soon the only sound was that of children hard at play.

Like most older eastern cities, Farrell has a shortage of playgrounds in densely populated areas. Large sites are unavailable or too distant from center city. Farrell has found one answer in pocket-sized parks.

While other vacant lots in several parts of the city are being transformed into play areas, the success of the first keeps growing. —ELBERT WELLS, *soil conservationist, SCS, Stroudsburg, Pa.* ♦

A pipedream comes true

Norbert Wasserburger is one of six neighboring water-short Sioux County, Nebraska, ranchers who have seen their pipedream materialize in the form of a 29-mile plastic pipeline.

Potable water has been a challenging problem on what is now the 5,200-acre Wasserburger ranch since Henry Wasserburger, Norbert's grandfather, homesteaded the original 160 acres in 1887. Surface water and shallow-well water in the area have too much salt.

On the Wasserburger ranch, 15 dug wells and 20 dams failed to solve the water problem. At various times the family has hauled drinking water from Harrison, 20 miles away, and driven their cattle 3 miles to water at Hat Creek.

Wasserburger and his neighbors for years had coveted the good water in the foothills of Pine Ridge, about 15 miles away. To get the water to their ranches, they formed the Prairie Dog Pipeline Company in 1968. They were helped with their project by SCS specialists at Crawford, Nebr., and obtained cost-sharing under the Great Plains Conservation Program.

The six ranchers now have dependable water available for more than 15,000 acres of their range, and 31 watering tanks have been installed. Three of the families have, for the first time, ample supplies of potable water in their homes.

Standing near one of his tanks, Wasserburger summed up the bold step the ranchers had taken to whip their water problem saying: "I sure like to see those cows come up to a tank and take a good drink, rather than sipping around that alkali water."—WILLIAM J. MADER, *SCS technician, Crawford, Nebr.* ♦

Monitoring study completed

The Mitre Corporation, a private research firm under contract with the Council on Environmental Quality, has completed a comprehensive report on "Monitoring the Environment of the Nation."

It contains not only information on current monitoring but also suggestions for new types of monitoring activities.

Federal agencies, including the Soil Conservation Service, have been asked by CEQ for comments and recommendations on the Mitre study. ♦

Recon . . .

The District of Columbia's first nonprofit recycling center for trash was ordered closed as a nuisance. Complained the neighbors, "It became a dump."

Wind erosion in the Great Plains reached a 14-year high last season —the 4.7 million acres damaged indicating the worst year since 1956-57 when 10.3 million acres underwent extensive soil movement. The erosion marks a serious increase from the all-time low of 995,150 acres damaged in 1968-69.

The excessive damage was due to drought that struck the Southwest; the Soil Conservation Service survey showed 2.7 million acres of land damage in west Texas alone. Most of this season's damage was on lands insufficiently protected by the residues of the previous year's crops. Emergency tillage was effectively used to protect 3.9 million acres.

Strip-minable coal. Persons interested in the current environmental quality restrictions governing strip mining can find an up-to-date summary of these laws in a catalog of strippable U.S. coal deposits compiled by the U.S. Bureau of Mines. At this time 21 states have environmental quality laws governing surface-mine reclamation.

Interested persons can consult open-file copies of "Strippable Reserves of Bituminous Coal and Lignite in the United States" at the Department of the Interior Library, Washington, D.C., and at Bureau of Mines offices in Pittsburgh, Denver, Spokane, San Francisco, Dallas, and Juneau.

Stewardship message via the milk route. Purchasers of 1,500,000 cartons of milk in Louisiana last spring got a message—"Observe Soil Stewardship Week" — along with their milk. The milk carton information campaign was initiated by SCS district conservationists and soil and water conservation district supervisors.

Five dairies took part in the campaign. One dairy in Baton Rouge advertised on nearly a million cartons. The dairies contributed their help without charge. A spokesman explained, "We know the value of conservation."

Right change. "We will find new ways to be right when we hear the voices of need throughout the world, and here at home, that are saying to us: your machines feed more people, but many are still not fed; your chemicals increase production, but they poison the environment; your vision is fixed on a single industry, but a whole population needs your services; when are you going to change?"—*Valedictory address of Robert E. Stewart, Past-President of the American Society of Agricultural Engineers.*

A study, **"Soil Erosion in an Urbanizing Watershed,"** shows that agricultural land may contribute as little as one-fifth the total annual soil loss in an urbanizing watershed.

The Michigan State University Agricultural Experiment Station study, prepared by Terry A. Ringler, district conservationist at Grand Rapids, and C. L. Humphreys, from Michigan State University's Department of Resource Development, indicates that land undergoing urban development together with idle land being held for future development account for more than 68 percent of the annual erosion occurring in the watershed.

"There are two crimes against humanity which at their inception seemed like real boons," says Dr. Donaldson Koons, chairman of Maine's Environmental Improvement Commission. "They are the internal combustion engine and the flush toilet." Dr. Koons is concerned about the vast amounts of water used and then released by flush toilets, which eventually contaminate streams, rivers, and even the ocean. "For summer camps," he says, "outhouses are the best disposal you can find." He also worries about the wastefulness of flush toilets (100 gallons of water per person per day) in a time of short water supply.

Economists on the Virginia planning party are currently working toward establishing gaging stations on all watershed projects completed to date. They hope to provide a simplified procedure that can be used by district conservationists and sponsors to show the damage prevented from each specific storm flow. Data supplied by the prospective gaging stations will be used in public information programs in describing the benefits of watershed projects.

Pennsylvania is using **limestone barriers in waterways** in hopes that they will be an inexpensive way of neutralizing the acid in drainage from coal mines. If the prototype project on Trough Creek, Huntington County, proves successful, it is expected that this method of control will be extended to other streams polluted by coal-mine acid. The use of limestone barriers in acid-polluted creeks was prompted by successful research carried out by the Institute for Research on Land and Water Resources, Pennsylvania State University.

Review

Books

Crop Growth and Culture. By Roger L. Mitchell. *1970. Iowa State University Press. 349 pp., illus. $9.50.*

This book was written for two major purposes: (1) to develop an understanding of the important principles underlying the practices used in the culture of crop plants and (2) to develop the ability to apply these principles to production situations.

Because all crop growth and crop culture is a system that exploits photosynthesis, a discussion of radiant energy fixation, leaf anatomy, and chemical reactions involving ADT and ATP is presented first. The factors of temperature, light, CO_2, water, leaf arrangement, leaf age, mineral status, and LAI, as they affect photosynthesis, are also presented early in the text.

From this basic introduction the author branches out to review every aspect of crop culture from mineral nutrition to harvest and storage of seed and fiber. He discusses all factors involved in crop culture in general terms and gives few references to a crop-by-crop approach. The general approach allows the book to be more meaningful to readers interested in a greater variety of crops.

A chapter on shoot and bud growth and differentiation contains an excellent review of factors affecting tillering. The author discusses at least nine factors and cites at least 20 publications. All of the text is well cited and extensive literature lists follow each chapter.

The discussions of seed development, germination, and production are of special interest. Seed anatomy, development, dormancy, germination, quality, certification, and production information is presented in a general way but is complete and adaptable to many crops.

The text was published for and will probably find its most use in the agronomy classroom. The author has achieved his purpose of presenting the important principles underlying the practices of crop culture. The ability to apply all of the principles to individual crops will take study and skill on the part of the reader.—Herbert W. Everett, *manager, National Plant Materials Center, SCS, Beltsville, Md.*

New publications

Planning for an Irrigation System. By J. Howard Turner and Carl L. Anderson. *1971. American Association for Vocational Instructional Materials. (Engineering Center, Athens, Ga. 30601) in cooperation with Soil Conservation Service, U.S. Dept. of Agr. 107 pp., illus. $6.50.* The purpose of this book is to help an individual answer three basic questions before investing in an irrigation system: Will irrigation be profitable for me? Which type of system should I use? Approximately how much will a system cost? You will not learn from this manual how to design your own irrigation system, but you are told where to go for help to get a system that best fits your needs.

Multilateral Assistance for Agricultural Development. *1971. USDA Foreign Economic Development Service Rpt. 10. 43 pp.* A survey of major multilateral agencies concerned with agricultural development in low-income countries; covers the objectives of these agencies, the types of programs they conduct, and their operational procedures.

Corporations With Farming Operations. By George W. Coffman. *1971. USDA Economic Research Service Agr. Econ. Rpt. 209. 49 pp., illus.* A survey to determine the number, kinds, and general characteristics of corporations directly involved in the production of farm products. Two earlier studies (Agr. Econ. Rpts. 142 and 156) have already been issued with some of the survey data. This report includes data from the two previous reports plus discussions on labor and management as well as special surveys of Hawaii and California.

A Soil Science Career for You in SCS. *Rev. 1971. USDA Misc. Publ. 716. 8-page folder, illus.*

Shall Not Perish From the Earth. *1971. USDA Forest Service. [36] pp., illus., color.* Reports that despite the environmental chaos caused by man—urbanization and crowded and encroaching cities—much of the land in the 20-state Eastern Region of the Forest Service stands today as a tribute to reclamation management. Makes the point that the beauty and substance of today's forests will be discovered in the expression of tomorrow's cities.

Rural Poor Who Could Benefit From Job Retraining in the East North Central States. By Marvin E. Konyha. *1971. USDA Economic Research Service Agr. Econ. Rpt. 204. 35 pp.* Presents the findings of a 1967 survey made of open-country residents over 15 years of age.

Prospective Cost of Adjusting to a Declining Water Supply—Texas High Plains. By Wyatte L. Harman, W. F. Hughes, and J. R. Martin. *1971. Dept. of Agr. Econ. and Rural Sociology, Tex. Agr. Expt. Sta. (College Station, Tex.). Tech. Rpt. 71-3. 23 pp., illus.* A detailed account of 1969 irrigated-farm operations; includes acreage of various crops irrigated, number of times irrigated, production practices and requirements, and amount, kind, size, costs, and use of irrigation facilities on 19 farms on the Southern High Plains. Side roll sprinkler irrigation systems equipped with trailing laterals were used.

In Your Service, the Work of Uncle Sam's Forest Rangers. *Rev. 1971. USDA Agr. Inf. Bull. 136. [24] pp., illus. $0.25.*

Decorative Plants of Appalachia—a Source of Income. By Thomas C. Nelson and Malcome J. Williamson. *1970. USDA. Agr. Inf. Bull. 342. 31 pp., illus. $0.35.* Describes coniferous and hardwood trees, shrubs and vines, ferns, and lesser plants that grow in the mountain areas of Alabama, Georgia, Kentucky, Maryland, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia.

Small Watershed Projects. *Rev. 1971. USDA Soil Conservation Service, SCS-CI-4. 4 pp., illus.* A brief step-by-step outline on how small watershed projects work.

Growing Ornamentals in Urban Gardens. By Henry M. Cathey. *1971. USDA Home and Garden Bull. 188. 22 pp., illus. $0.15.* Gives specific information on the kinds of plants that will grow in an urban environment, methods and techniques used to grow them, and the protection plants need to survive.

A Comparison of Capital Requirements and Labor Use, Alternative Sprinkler Irrigation Systems—Texas High Plains. By Ronald D. Lacewell and William F. Hughes. *1971. Dept. of Agr. Econ. and Rural Sociology, Tex. Agr. Expt. Sta. (College Station, Tex.). Inf. Rpt. 71-3. 15 pp.* Reports on water distribution costs on Southern High Plains farms equipped with side roll, trail-line sprinkler irrigation systems.

The Projected Effects of Water Resource Development on Land Use and Crop Production Costs in the White River Basin. By Gene Harris and James H. White. *1971. USDA Economic Research Service Bull. 764. 51 pp., illus.* Estimates the future effects of proposed drainage and flood-protection projects on land use and crop production costs in the White River Basin and evaluates the potential of the White River Basin to meet its share of the nation's projected food and fiber needs in 1980.

A Selected Bibliography of Natural Plant Communities in 11 Midwestern States. By Arnold J. Heerwagen. *1971. USDA Misc. Publ. 1205. 20 pp. $0.30.* Publications listed describe plant communities in Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North and South Dakota, and Wisconsin.

Soil surveys

Phillips County, Colorado. By John I. Brubacher, Alan E. Amen, Louis A. Fletcher, Everett E. Geib, and Tom R. Moore. *1971. 53 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Calvert County, Maryland. By Earle D. Matthews. *1971. 76 pp., illus.; maps 4 inches to the mile (1:15,840).*

Greene County, Alabama. By James A. Cotton. *1971. 94 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Washington County, Wisconsin. By Keith O. Schmude. *1971. 105 pp., illus.; maps 4 inches to the mile (1:15,840).*

Carson Valley Area, Nevada-California. By L. N. Langan. *1971. 129 pp., illus.; maps 4 inches to the mile (1:15,840)*

Power River Area, Montana. By John L. Parker, Lester R. Guptill, Jr., Kenneth M. Bajema, William A. Berg, Leon Logan, and Robert E. Adams. *1971. 99 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Orange County, Virginia. By J. B. Carter, J. W. Wills, and W. E. Cummins. *1971. 169 pp., illus.; maps 4 inches to the mile (1:15,840).*

Keokuk County, Iowa. By R. G. Jones and J. D. Highland. *1971. 107 pp., illus.; maps 4 inches to the mile (1:15,840).*

Meetings

September

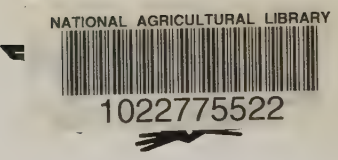
5-15 International Soil Science Society, West Germany
13-15 International Association of Game, Fish and Conservation Commissioners, Salt Lake City, Utah
Theme: The Role of Wildlife in a Changing Environment
Keynote speaker: Nathaniel P. Reed, Assistant Secretary of the Interior (Fish and Wildlife and Parks)
15-18 American Fisheries Society, Salt Lake City, Utah
19-23 National Conference on State Parks, Des Moines, Iowa
21-24 Association of Conservation Engineers, Jackson, Wyo.
26-30 Society of American Foresters, Cleveland, Ohio
Theme: Forestry in an Urbanized Society
28-30 National Symposium of Animal Waste Management, Warrenton, Va.

October

3-8 Water Pollution Control Federation, San Francisco, Calif.
10-13 American Forestry Association, Seattle, Wash.
11-13 Future Farmers of America, Kansas City, Mo.
13-15 National Conference of Editorial Writers, Pittsburgh, Pa.
13-16 National Association of Biology Teachers, Chicago, Ill.
14-15 American Forest Institute, St. Louis, Mo.
15-16 The Nature Conservancy, Savannah, Ga.
16-20 American Bankers Association, San Francisco, Calif.
17-20 Farm and Industrial Equipment Institute, San Antonio, Tex.
17-21 National Association of State Foresters, Honolulu, Hawaii
18-22 National Congress for Recreation and Parks, Houston, Tex.
18-22 American Society of Civil Engineers, St. Louis, Mo.
20-22 Association of Engineering Geologists, Portland, Oreg.
23-26 American Institute of Biological Sciences, Inc., Miami Beach, Fla.
24-28 American Institute of Planners, San Francisco, Calif.
25-29 American Water Resources Association, Washington, D.C.
30-Nov. 2 Sprinkler Irrigation Association, Scottsdale, Ariz.

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From the Administrator:

A new kind of magazine

A new editor, Phil Chavez, has taken over responsibility for SOIL CONSERVATION magazine, and, like all new editors, he brings with him a fresh outlook and new ideas.

This seems an appropriate time, therefore, to talk about what we are trying to accomplish with these 24 printed pages each month and to share some of the thinking behind the changes in store.

The primary audience for SOIL CONSERVATION is our own employees and the supervisors of the 3,000-plus conservation districts throughout the nation. The magazine is read by many other people, including nearly 3,000 paid subscribers, but it is, by and large, a "family" publication, directed editorially to SCS employees and district people.

Its primary function is to inform, and we want that information to be as useful and easy to assimilate as possible.

What sort of informing do we want to do?

First, we want to share ideas that are worth emulating, that can help conservationists do a better job. The article this month about DC John Cooper's successful series of hometown newspaper stories on 80-year-old cooperators is an example.

Second, we want to present "spark-plug" ideas, ideas with a chance of catching fire and spreading to other communities. That's why the editor decided to run an article about the "conservation pledge" for builders devised by a local chamber of commerce in Virginia. Those pledges could catch on in dozens of different communities.

Third, we want to present more news about conservation—new conservation research; new conservation applications and practices; new studies, books, and reports; new campaigns and ideas.

Fourth, we want to run articles that can help our people obtain the broadest possible perspective on the increasingly complex job of soil and water conservation in the seventies.

Obviously, this is a tall order, and Phil Chavez won't be able to do it without a great deal of help from the field. Every good story begins with accurate reporting, and, as our moon explorers have discovered, nothing beats going to a site yourself and taking a look around.

Everyone in the field should try to be the "eyes and ears" of the magazine. Some of you, both SCS employees and district supervisors, are excellent writers and photographers, and your submissions are both needed and welcome. There also are people in the field who would rather break an arm than write an article, but who have the ability to spot a good story and tell somebody about it. The editor has need of calls and letters from people in this latter category who can provide story leads for a professional writer to cover.

A month ago, the themes for the next 13 issues of SOIL CONSERVATION were announced. They deal with such significant topics as the future of districts, waste disposal, and town-and-country planning. These can be a helpful guide to field people looking for story ideas of current interest.

So keep our new editor supplied with your ideas and suggestions. SOIL CONSERVATION can be as informative and as fresh and lively as the people in the field want to make it.

Kenneth E. Grant

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Conservation

U.S. Department of Agriculture/Soil Conservation Service October 1971 37/3



SOIL CONSERVATION
October 1971, Vol. 37, No. 3

In many parts of the country, October brings a colorful change to forest and woodland. So October seems a good time to talk about trees, and SCS Administrator Grant does exactly that in his message. Carrow Prout tells us about trees for the future in the lead article, and a Texas district conservationist recounts his "quest for a rare tree."

The photographs on both the front and back covers further suggest the theme of this issue of SOIL CONSERVATION. The **front cover** shows the native forest, water, and mountain in perfect balance. The photograph is by William Petty and Pat Allen and was taken in their scenic Washington along the Washougal River. The **back cover** shows a young tree growing up in Michigan, photographed by Erwin Cole from Nebraska.

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Let's talk about trees

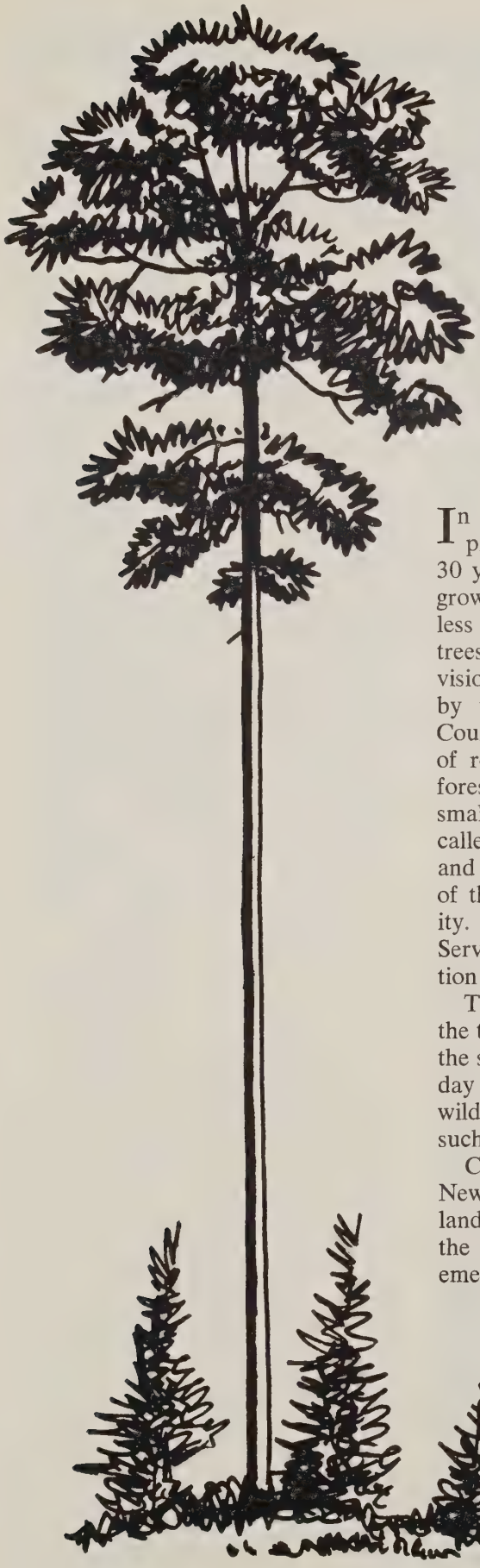
Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20205.

CLIFFORD M. HARDIN, Secretary of Agriculture
KENNETH E. GRANT, Administrator, Soil Conservation Service
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Bringing up a Forest

by Carrow T. Prout, Jr.
Chief forester, SCS
Washington, D.C.

In America the need for wood products will double in the next 30 years, and the land available for growing trees will shrink. Nothing less than a whole new forest of super trees must be grown. Just such a visionary plan is being developed by the Southern Forest Resource Council, an organization composed of representatives from the South's forest industries. About one million small-woodland owners will be called on to cooperate with industry and government to make this dream of the South's "third forest" a reality. And the Soil Conservation Service will also have a contribution to make.

This forest of the future is called the third forest to distinguish it from the second, which is serving present-day requirements, and the first—the wilderness discovered by explorers such as Captain John Smith.

Captain John Smith landed in the New World in 1607; he found a vast land of dense virgin forest. This was the South's first forest, a broad emerald belt extending from the hills of Virginia to the plains of east Texas.

Within a few years Captain Smith's settlement at Jamestown was the site of the first sawmill in America. Built by Polish and Dutch millwrights, the sawmill processed logs into lumber for houses, ships, furniture, and farm implements. The South's first forest continued to meet the nation's need for wood products as frontiers began to open up.

By 1910 the first forest had yielded more than a trillion board feet of lumber—enough to build 100 million houses. Conservationists, concerned with the increase in cutover lands and the disturbing evidence of soil erosion, began to see signs of the approaching extinction of the forest.

In 1930, economic depression began to sweep over the land. But the depression carried with it the seeds of the South's second forest. The Soil Erosion Service, predecessor of the Soil Conservation Service, began planting trees in

1934. The eroded hillsides of southern farms and cutover and burned forest lands were the first areas planted.

The fire protection programs of the various state forestry agencies were paying off. A drastic reduction in tree loss due to forest fires was beginning to be felt at this time.

Individual states began to take over the production of tree seedlings. They greatly increased this production during the early 1940's. And, at about this time, SCS began to move away from the project type of public works. Working through soil and water conservation districts, SCS began to concentrate on helping the individual district cooperator prepare a conservation plan for his land.

It is with the individual woodland owner that SCS has made its greatest contribution to the South's second forest. Sixty-four percent of the entire land area of the Southern States is forest land; 42 percent is privately owned by district cooperators who have been helped by SCS in working out a complete plan that includes woodland conservation. These district cooperators have planted nearly 14 million acres in trees, improved about 11 million acres of forest land, and harvested pulpwood, saw logs, poles, and other forest products in a prescribed manner from more than 27 million acres of woodland. And SCS helped them do all of this.

Contrary to predictions there has been no funeral for the South's forest industry. Between 1935 and 1965 an estimated 150 billion cubic feet of timber was harvested to supply the ever-expanding pulp industry, sawmills, and other manufacturers of wood products. And a 1965 timber survey showed that the South still had a bank account of 145 billion cubic feet of standing timber—15 billion cubic feet more than it had in 1935.

But the demands of the nation are ever increasing. Before the end of the century it will be necessary to grow another forest in the South



—and on a land base reduced more and more by expanding population centers, airports, highways, and dams.

The Southern Forest Resource Analysis Committee report, published by the forest industries in 1969, recommends timber stand improvement as the quickest, most economical, and most effective way to start the South's third forest. It also recommends the planting of 30 million acres with genetically superior tree stock and increasing and improving fire prevention and control programs.

Ultimately, the success of the South's third forest will depend on the massive extension of improved forestry practices to the small privately owned woodlands. The third forest effort presents a vehicle for the closest cooperation between all people and agencies. The Soil Conservation Service has assured the forest industries that it will continue to cooperate with them through conservation districts in helping landowners grow the forest of the future. ♦

Color it green and growing

by C. F. Lyle
Project coordinator, SCS
Wiregrass RC&D Project
Ozark, Alabama

The great problem facing the sponsors of the Wiregrass Resource Conservation and Development Project can be summarized in one word—underdevelopment. The vast natural wealth of the nine counties in the southeastern Alabama project area —including 1 million acres of cropland, more than 2 million acres of timberland, and 8 billion tons of mineral reserves—is largely underdeveloped. Of 2,288,000 acres of timberland, for example, almost one-half needs improvement.

Underdevelopment is, however, a problem that suggests its own solution, and the RC&D Project planners have given first priority to measures that will accelerate land treatment and offer immediate possibilities for increasing farm income.

Now, a forestry improvement association is beginning the needed development of the land. The Henry Forestry Association, Alabama's first, was organized in October 1969 by a group of community-minded timberland owners. The association numbers about 100 members.

C. S. Keller, president of the association, said that the main objective of the association is to coordinate a program that will help Henry County woodland owners carry out an improvement plan for their woodland. "A study of forests in Henry County by forestry experts indicated that we need more selective thinning, control of undesirable species, tree planting, and fire protection," said Keller. And he added, "The cost of these improvements would have made them prohibitive to many landowners in Henry County. Many woodland owners have small acreages and don't have the time and money to carry out needed improvements without some type of assistance. We felt that an organization of this type could help them get started."

Association members are eligible for technical and financial assistance in the association program; they pay $10 annual membership dues.

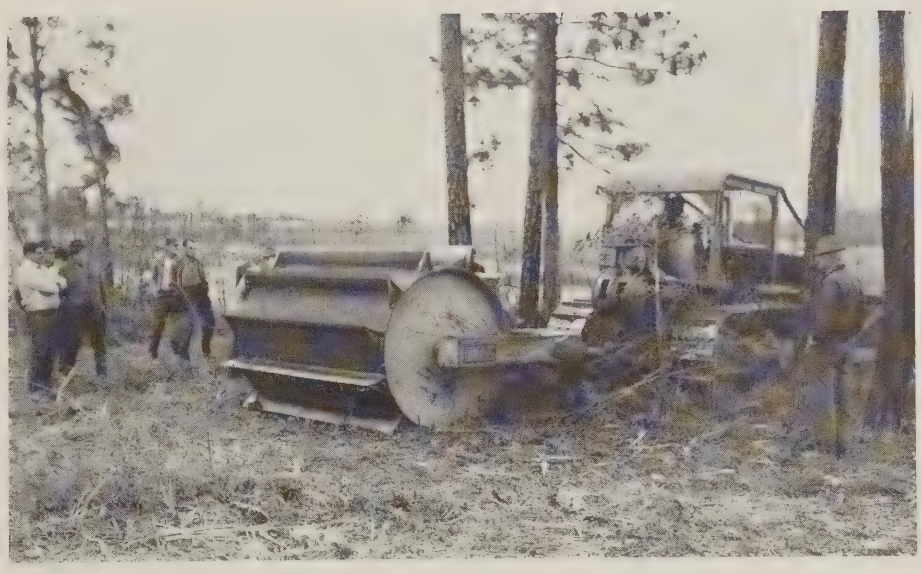
About 50,000 acres of woodland in Henry County need improvement. All 50,000 acres need improvement planting; 25,000 acres will have to be cleared before the planting can be effected. The association is currently working on a program to chop the undesirable woody growth from about 6,500 acres of land and plant it in pines. A rolling chopper for land clearing has been purchased and is rented to association members for $4 per acre. The total cost of site preparation comes to about $31 per acre. When a site is cleared, selected species of pine are planted on a 10- by 6-foot spacing, 726 trees to the acre. The association also provides a tree planter to members for $4 per acre.

In addition to site preparation and tree planting, the association is seeking better markets for its members and is working to obtain another fire-watch tower for the southern part of the county.

From its inception, the forestry association has received support and technical assistance from the Department of Agriculture. C. Glynn Blackwell, SCS district conservationist; Bobby Bradly, Henry County forest ranger; and Douglas Smith, RC&D forester with the Alabama Forestry Commission, were all instrumental in helping to get the association organized.

The association has the support of the Henry County Soil and Water Conservation District and the Henry County RC&D Steering Committee. Technical assistance has been pledged by the Soil Conservation Service, the Extension Service, and the Alabama Forestry Commission. Rural Environmental Assistance Program cost-sharing is available for site preparation and tree planting, and the association's purchases of equipment—rolling chopper, tree planter, and scraper—were made possible by an RC&D loan through the Farmers Home Administration.

Sponsors and planners of the Wiregrass RC&D Project, attempting to provide a better standard of living through resource development, agree "This is the way it's done." ♦



Land clearing is easier with a rolling chopper. Members of the Henry Forestry Association rent this one for $4 per acre of land cleared.

Quest for a rare tree

by Joe J. McEntire
Area conservationist, SCS
Uvalde, Texas



My search for a rare tree, the Texas Pistache (*Pistacia Texana*), began more than 2 years ago; it ended successfully recently along the remote canyon walls of the Rio Grande several miles below the Pecos River.

Previously, ecologists and conservationists had feared that a seed source for this rare tree had been lost, for the newly impounded waters of Amistad Lake in the summer of 1968 covered the only two Pistaches known to local ranchers before seed or cuttings could be secured.

In 1969, searching high up on limestone cliffs, I located two trees, a male and a female, but their seed was not mature. I was unable to return to the remote canyon area later in the season to secure seed, so the project was shelved.

The following year, I returned to the area, accompanied by Jack W. Stevens, SCS soil scientist in Uvalde, and Leon R. Walton, a local rancher. We quickly spotted the trees that I had discovered the previous year, but, to our disappointment, when we reached them we saw that the female tree had been surrounded by rising water from Amistad Lake and was dead. The male of this tree species cannot produce seed alone, so Amistad Lake had again frustrated our hopes.

We searched further in the same area but higher up on the canyon wall. Finally we found a large Pistache with a good crop of mature purple berries.

Now that a collection of seed has been secured, further evaluation of the rare tree is possible. SCS re-



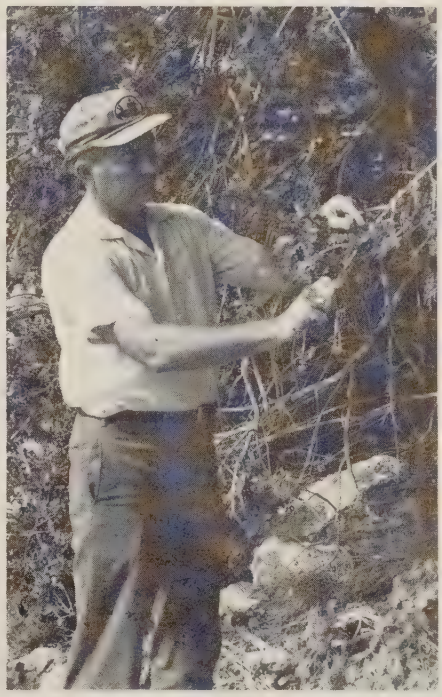
searchers will study Pistache plantings at the James E. Smith Plant Materials Center in Knox City, Texas.

The Texas Pistache should be a valuable ornamental tree. An evergreen, its mature foliage is dark green, and its springtime new growth is crimson red. Late in summer the developing fruit is first a reddish color; later, as it matures, it turns purplish black.

The value of the tree's fruit for birds and other wildlife is not known, but its seed should attract birds early in fall. Goats have browsed the trees that were found, suggesting that the Pistache may also prove to be a useful food for deer.

In all, we located about a dozen Pistaches that are beyond the reach of the waters of Amistad Lake. Some of these trees are no doubt males, and others are in nearly inaccessible areas on the steep limestone cliffs, but probably there are enough accessible females to provide a seed source for further evaluation. If Texas Pistache turns out to be a desirable native ornamental, it will be available in a few years to commercial nurseries and the public. ♦

The Texas Pistache has been found only in the remote area around the mouth of the Pecos River. The rising waters of Lake Amistad (top, left) drowned these Pistaches before seed could be secured.
(Above) Jack Stevens, an SCS soil scientist, examines a Pistache that was found well above the reach of the lake waters.
(Right) Joe McEntire, the author, examines seed on the rare tree.



Tapping a resource with a sweet return

by Russell V. Jongewaard
District conservationist, SCS
Little Falls, Minnesota

Central Minnesota's invigorating climate is ideal for making maple sap flow. Twelve years ago, Roman Klisch knew this but knew little else about maple syrup production. Today, Klisch is recognized as one of the best maple syrup producers in Minnesota.

Klisch has seeded down his 180-acre farm on the banks of Two Rivers Creek in Morrison County and concentrates his time and effort on a south 40 that has a beautiful stand of sugar maple.

"I logged the first 20 acres of this sugar bush in 1930 and the other 20 acres in 1935, selecting several thousand board feet of basswood, oak, and elm and leaving the sugar maple," said Klisch. "It wasn't until 12 years ago that I started thinking about tapping the maples."

Klisch and two of his sons first cleared brush, cut down snags and cull trees, and opened up a few trails. "Next," said Klisch, "we had to get an evaporator and learn how to cook sap."

From 1963 to 1966, Klisch spent many hours learning about maple syrup production. He drove many miles to attend meetings and to visit producers in Minnesota and Wisconsin. "I learned a lot, but I still have plenty to learn," confesses Klisch. The Soil Conservation Service and Marv Smith and Bill Miles, Extension Service foresters at the University of Minnesota, gave encouragement.

In 1966, Klisch purchased an evaporator from a defunct operation on the North Shore of Lake Superior. The 6- by 18-foot copper evaporator was modified and converted from wood burning to oil burning and installed in a new 30- by 40-foot building. The evaporator, fired by three oil burners that use 24 gallons of fuel per hour, is automatically controlled and when going full blast cooks 400 to 600 gallons of sap per hour.

Freshly collected sap is stored in two 6,000-gallon glass-lined storage tanks inside the sugar house; from there it is pumped automatically to an overhead tank that feeds by gravity directly into the evaporator. From tree to evaporator, the sap is filtered seven times. The glass-lined storage tanks are equipped with ultra-violet lights to keep down the bacteria count.

"The first sap started boiling through the evaporator on April 6, 1967. We cooked down 40 gallons of sap for 1 gallon of syrup," Klisch said. "My son Joe was foreman of the woods crew. He had about 10 of his high-school buddies in the woods every day collecting sap from 3,000 taps. All of our sap is collected in specially made heavy-duty plastic bags and hauled in a mobile tank to a central collection tank. From there the crystal clear raw sap is pumped into a 1,500-gallon stainless steel tank on a truck and hauled a mile to the evaporator," Klisch stated.

Mrs. Klisch and Mary, one of the 12 Klisch children, operate the finishing pan in the sugar house. This final process gives the syrup a perfect density of 66.5. The maple syrup is collected and stored in 5-gallon cans until it is bottled and sold. Some finds its way to local residents, and the remainder is sold in bulk to wholesalers.

The 40 acres of sugar maple was divided into 62 plots in 1966. Each plot is now numbered so trees can be located for an accurate study of production. Each tree is also pinpointed on a map and its diameter





recorded for a detailed inventory. The map will also be used to design a central collecting system, using plastic tubing.

Roman Klisch is a cooperator with the Morrison County Soil and Water Conservation District. He is an ardent conservationist and influential booster of district programs. He states that the secret to the success of his sugar bush is the natural forest floor in his woods that has never been grazed or abused. ♦

(Top) Plastic bags are now used to collect the maple sap, otherwise the art of tapping sugar maples remains the same. (Bottom) From tree to evaporator Roman Klisch filters the maple sap seven times. Here he awaits a run of maple syrup from his evaporator.

High-caliber conservation

by Arlin J. Conradi
Agronomist, SCS
Woodward, Oklahoma

High-caliber conservation is fact, not theory, at the U.S. Naval Ammunition Depot in McAlester, Oklahoma.

The depot represents a complexity of resource problems and opportunities. Conservation work there has to support the basic mission of the depot and, at the same time, protect the natural resources.

The mission of the McAlester Depot is to produce ammunition (ordnance, in military terms) varying in size from light artillery to small guided missiles. The funds used to finance the installation come entirely from competitive contracts awarded by the various branches of the military. The technical competence of the base's work force makes it one of the most efficient operations of its kind in the nation. About 2,600 civilian personnel and 150 military personnel work at the base.

Being a production facility, the base is concerned about safety and security. Nine production plants are scattered throughout the reserve so that an explosion at one plant will not endanger the others.

Ammunition is stored in aboveground facilities mounded over with soil. The storage magazines, sometimes called igloos, occur several to a group, and 57 groups are on the base. The land used to store ammunition serves a dual purpose; it is also used for deer-herd management.

The perimeter of the base is leased to local farmer-stockmen for grazing and haying. Native hay meadows cover about 10,900 acres, of which half is mowable. Native grazing lands total approximately 10,400 acres.

There are 400 miles of roads and 200 miles of railroad line on the base. About half of the roads are paved, and the rest are gravel.

The man due much of the credit for the conservation work is Jim Hodge, the depot's national resources manager. Hodge, a southeast Oklahoma native, is by any standard a practicing ecologist with a love for the land and its bounty. A graduate forester, he worked with the U.S. Forest Service in Idaho and Arizona for 6 years before coming back to the country he calls his own.

When Hodge began his job in 1966, the Navy had asked for help in revising a conservation plan made in 1952 through an agreement with the Pittsburg County Conservation District. SCS range conservationist Neal Stidham worked with Hodge in completing details of the plan.

The foundation for the plan was a soil survey of the entire depot. "This plan was the easiest I have ever implemented," said Hodge. "Now some 5 years later the work being done is primarily management and maintenance.

"I'd call a soil survey the key to any natural resource management plan," Hodge continued. "To try to manage a unit without soil survey data would be literally shooting in the dark.

"When we draw up a lease for grazing or haying, we include in it part of the conservation work needed in the area covered by the lease. The bidder figures the cost of the specified improvements, charges it against the value of the contract to him, and submits his bid. The lessee generally contracts the agreed-to improvements to a construction contractor or vegetation vendor," Hodge explained.

"This may be an unusual way of doing business, but it sure has proved successful for us," Hodge said. Most of the erosion-control work done on the depot consists of revegetating critical areas, such as new construction sites and slopes along roads and railway lines, and stabilizing the sod on storage magazines. Roadway cutslopes are smoothed after construction and sprigged to bermudagrass, if seasonal, and overseeded with annual ryegrass. Straw mulch is blown on the cutslopes and is cut in with a roller.

"The annual ryegrass not only gives us good temporary slope protection but also provides excellent

winter grazing for our deer herd," Hodge said. About 200 acres of annual ryegrass is sown every year for erosion control.

The ammunition storage magazines require regular attention to keep erosion in check. Because of the steep slopes, sloughing is the most common problem.

"When we were revising our conservation plan back in 1966," Hodge said, "Neal Stidham used the soil map to locate four sites for getting topsoil suitable for use on the magazines. The soil for this purpose not only has to be fertile but stable too."

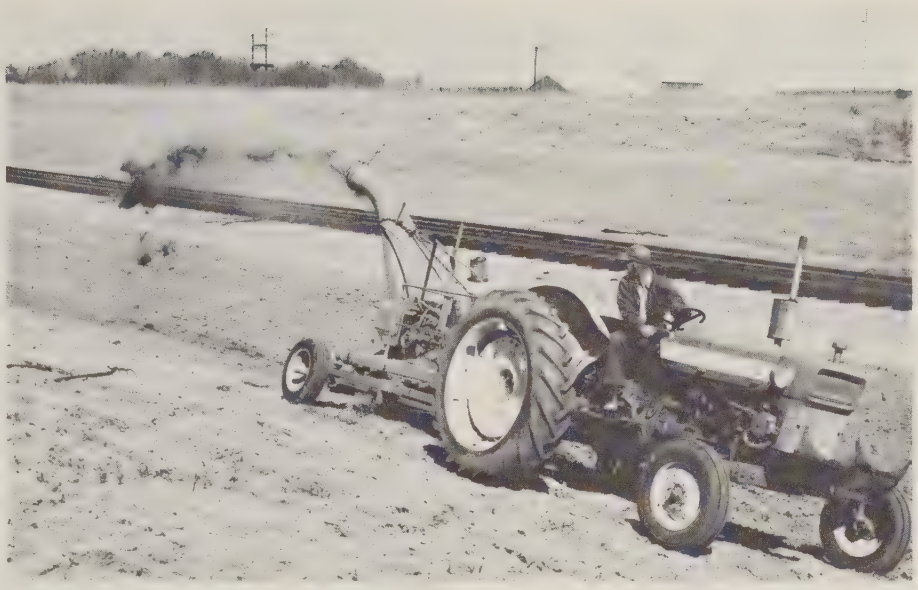
The storage magazines are sodded to bermudagrass, but, according to Hodge, after several years the native grasses and forbs take over.

Hodge's most recent conservation efforts have been directed toward water pollution. In steam cleaning cartridges, machinery, and storage facilities of TNT and other explosives, chemical solutions are flushed into nearby drainage systems. These chemicals had been believed to be nonbiodegradable. Concerned with the off-depot effects of these chemicals in the area's watercourses, Hodge and a Naval Ammunition Depot chemist, Ellis Pardee, set about to see if the pollution could be brought to a stop.

Through close observation and laboratory studies, the team discovered that the TNT solutions were degradable if retained for a sufficient time in holding ponds. Therefore, six ponds designed to hold runoff from the munitions plants were constructed. The ponds functioned so effectively that scheduled construction of a $300,000 purification plant was canceled. Other military bases heard of this success and began substituting ponds for expensive purification systems.

"What's even more important than the money saved," Hodge noted, "is that the water leaving the ponds is clear and free of chemical contamination."

As resource manager at the McAlester Depot, Hodge oversees still another conservation program—wildlife management. Efforts are made to maintain a herd of approximately 1,600 deer. Small game animals, upland game birds, and numerous species of song birds also make the Naval Ammunition Depot their home. Some 20,000 ducks and 9,000 geese overwinter on the base, along with six bald eagles.



Critical areas such as this cutslope get immediate attention at the McAlester Naval Ammunition Depot. Mulch is blown on cutslopes after sprigging or overseeding and then is cut in with a roller.

Fishing in the 100 ponds and lakes is a popular sport for employees and visitors. The lakes are well stocked with native gamefish and imported northern pike. The depot accommodated 2,700 fishermen during 1970.

The Bureau of Sport Fisheries and Wildlife and the Oklahoma Department of Wildlife Conservation work closely with Hodge and public works officer, Commander C. G. Bush, in providing technical assistance for the fish and wildlife management program.

Being a practical model of soil and water conservation, plant science application, and fish and wildlife management makes the McAlester Naval Ammunition Depot a natural for environmental studies. Students of nearby East Central State College, Oklahoma University, Eastern Oklahoma A&M College, Oklahoma State University, and area high schools tour the depot each year to study conservation and plant and wildlife ecology. More than 350 students were given conservation tours in 1970.

The total visitor count, including hunters, fishermen, sightseers, boaters, and students, during 1970 was 5,900. ♦

The U.S. Naval Ammunition Depot, McAlester, Okla., was first-place winner in the Navy's 1970 Natural Resources Conservation Awards. In 1969, it tied for second place in the Secretary of Defense Conservation Awards.

Once a sand dune . . .

by Howard M. Goldfinger
Information Division, SCS
Washington, D.C.

Alexander B. Maley will again harvest Christmas trees this year from land that was once considered of little value. Beginning in 1947, this strictly summertime resident of Michigan's northwest resort country has revitalized nearly 2,000 acres of sand dunes and scrub land by planting two and a half million trees. His success points to the revival of a whole area's economy through land-use planning.

Today, Michigan's northwest lower peninsula is a thriving place for orchards, forests, Christmas tree plantations, second homes, and year-round visitors. But in 1947, when Maley bought his first 40 acres of sandy pastureland above Little Platte Lake in Benzie County, land in the area was selling for $5 an acre.

For this once-forested region, the year 1947 was a time for striking out in new directions. Land values were at rock bottom, after having reached a peak during the 10 years following World War I when lumber ruled. But the lumber industry was now largely a thing of the past. And much of the farming that had moved in after the timber had been clear-cut remained marginal.

The combination of national economic depression and clear-cutting had left the area's economy and natural resource balance in a painful condition. But World War II was over. More people than ever were —or soon would be—on wheels, scouting for retreats in the countryside where they could escape the cities during the hot summer months.

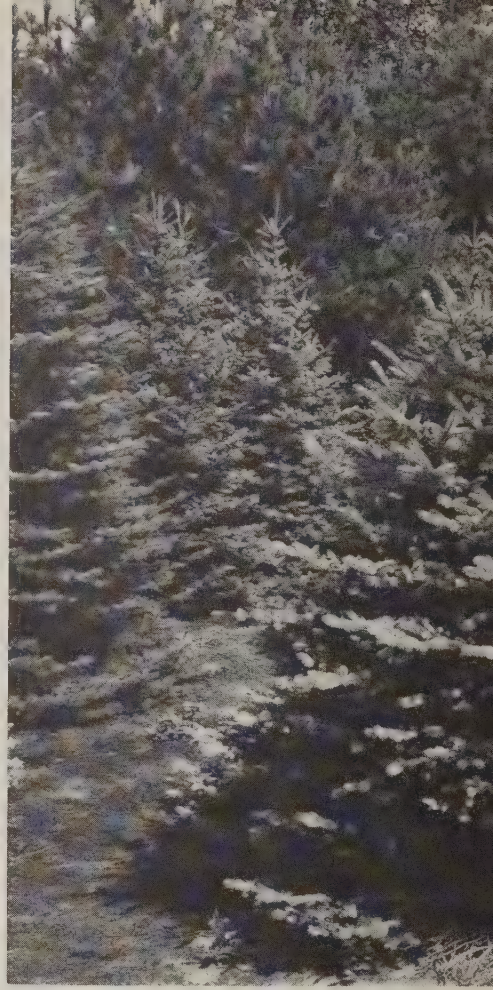
In buying his first land, Maley had in mind profit from timber as well as a summer place. The outlook seemed promising to this young chemical company owner from Chicago, for he was reading the signs of restored timber potential—he knew that between 1936 and 1939 the Soil Conservation Service in experimental demonstration projects had planted more than 1,300,000 trees and shrubs in the Michigan sand-dune country.

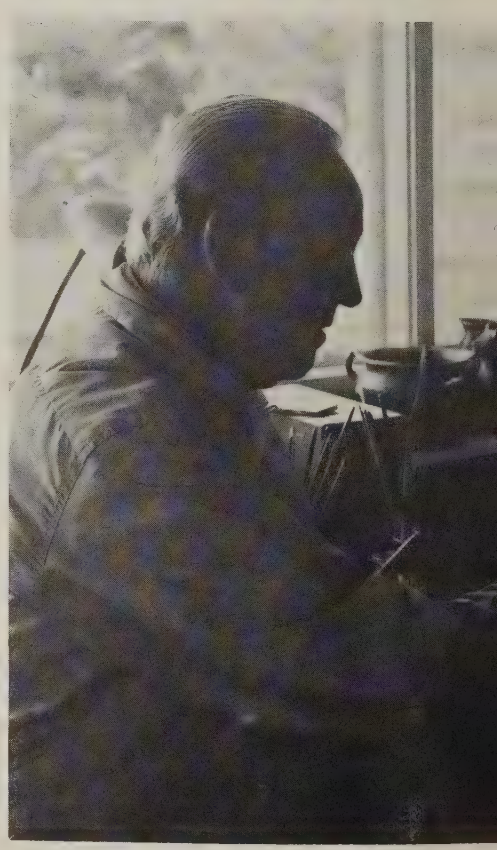
SCS, working with the Civilian Conservation Corps, had developed methods for establishing temporary brush and vegetative cover on the blow-prone dunes. The cover was designed to hold long enough for selected tree plantings to get well started. The light-colored sand took Scotch and jack pine best. The darker sand sites of higher fertility were suited to mixtures of red and white pine.

The practicality of these methods was mirrored in the steady 3 million plus average for tree and shrub plantings in the state by soil conservation district cooperators each year from 1940 to 1946. Then, the war over, the tree-planting trend really took off, rising to 5 million trees in 1947, jumping to 13 million in 1952, and cresting at 32 million in 1958.

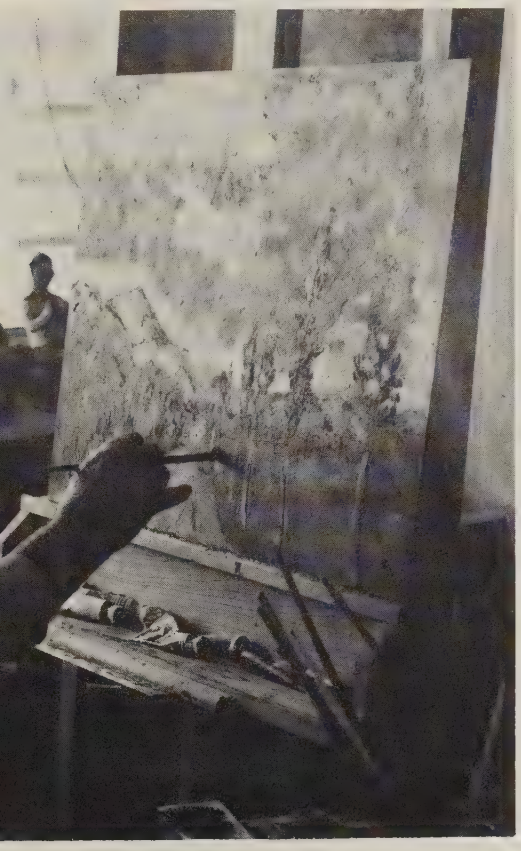
Maley himself was part of this upward movement. He joined the Benzie County Soil Conservation District as a cooperator in 1947. Then and thereafter, he worked out woodland - oriented conservation plans for each of the several tracts he acquired. He was assisted in developing the plans by Arvid Tesaker, a Soil Conservation Service conservationist working with the Benzie District.

By May 1958, Maley owned nearly 2,000 acres in the county and had planted close to a million trees. His conservation district cited him









Michigan sand dunes are productive again. These Christmas trees (above), tightly sheared by hand, take 12 or 13 years to mature for marketing, according to Alexander B. Maley on the left, here seen with Arvid Tesaker, SCS district conservationist in Benzie County.
(Left) Outdoor scenes of trees and dunes are frequent subjects of the oil-painting skills of Maley. His studio, shown here, is part of the Maley house in Honor, Michigan, overlooking Little Platte Lake. The house stands on part of the original acreage bought by the painter-conservationist a quarter of a century ago.

for his "outstanding tree-planting program." By then also he had switched from a lumber and pulpwood operation to Christmas trees.

Today, Maley harvests Scotch pines for the Christmas tree market, in which Michigan has come to rank near the top nationally. The trees, from plantations covering about 500 acres, are ready to be marketed as 6-footers in 12 or 13 years.

Aside from his Christmas tree plantations, Maley's land is mostly in red pine, some mature enough for thinning—the first step in selective harvesting. Benzie County as a whole boasts some 10,000 acres of similarly reforested land. Land prices in this still burgeoning area have risen steadily to $250 and more an acre.

Maley sees the personal goals he has attained as part of the larger picture of regional development. Two recent gifts from him highlight his thinking and approach. Because he believes the key to healthy progress for the area lies in preserving the "built-in wilderness quality" that makes it so attractive for summer visitors, he recently gave 169 acres of wetland to the Nature Conservancy, Inc., of Washington, D.C., for permanent upkeep as a natural reserve. His second gift, 220 acres alongside Sleeping Bear Dune National Lakeshore, went to Northwestern Michigan College in nearby Traverse City. This site, also to be maintained as a nature area, will be the college's outdoor laboratory and research center.

Maley feels that land-use planning in Benzie County and the 12 other counties included in the Northwest Michigan Resource Conservation and Development Project will help protect the orchards, forests, and wilderness areas that are the linchpins of the local economy and, at the same time, keep the building of second homes in balance with these interests.

The dollars and cents and social soundness of this view has 25 years of living proof to recommend it. ♦

A site for sore eyes

by George E. McGrath, Jr.
Information Division, SCS
Washington, D.C.

If your eyes smart for no apparent reason, look around—it might be air pollution from a nearby, open-burning dump. It may hurt just to look at the smoking mess and blowing paper. But don't curse the trash. Get it working for you.

The sanitary landfill, where refuse is deposited, compacted, and covered daily with a layer of soil, is steadily replacing the old open dump. And, when the fill is completed, covered, and grassed, many surprising things can result: parks, playgrounds, football fields, golf courses, or farmland.

Take Big Spring, Texas, for example. Big Spring is the county seat (population 35,000) of Howard County in western Texas. This city found a common solution for three problems.

Big Spring urgently needed a suitable site for disposal of 90 tons of refuse a day. Two farmowners, in an area next to an industrial site and adjoining a major highway, were losing valuable pastureland to deepening gullies and other forms of soil erosion. And near the same site, the Texas Highway Department was faced with costly repairs on Interstate Highway 20 as water ate away at the roadbed. These trouble spots covered an area of about 25 acres.

Could the gullies be filled with refuse? Had the city found the right site for its solid-waste disposal problem? And would a waste-disposal project on this site help stop erosion of the highway and reclaim good agricultural land?

City leaders, landowners, and the Texas Highway Department got a "yes" answer to these questions from the Soil Conservation Service. Planning began in 1966 and led to the project's full-scale operation the following year.

A soil survey of the area showed that soil on the site had adequate drainage and permeability. It was not too sticky when wet, and it could be worked in any weather. The soil could support plant growth, it was not shallow to rock, and landfill seepage—called leachate—could filter slowly through it and be purified along the way.

Easements were secured from the landowners for use of the site for the 3-year life of the project. The highway department and the city agreed to furnish funds, manpower, and machines for landfill operation and maintenance and to construct waterways, culverts, and fences.

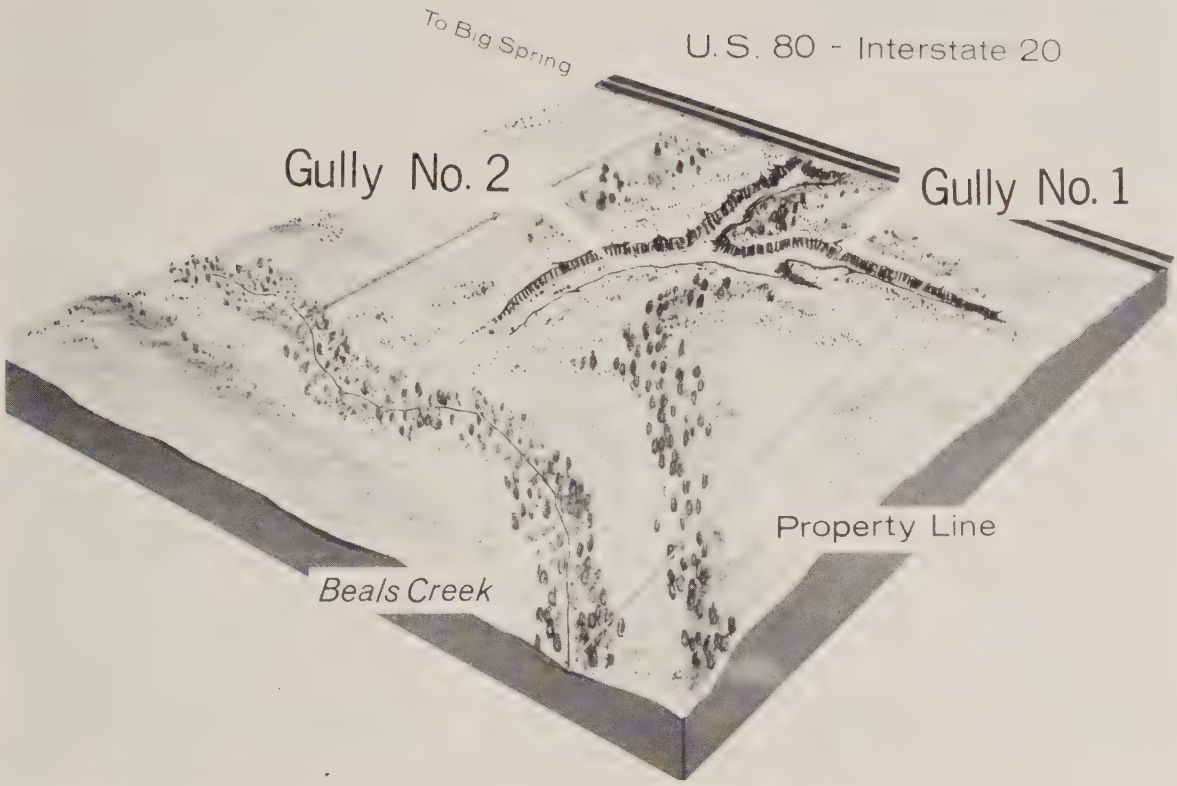
The U.S. Department of Health, Education, and Welfare granted $90,000 over 3 years for help in financing the project and for a weigh-station to weigh the trash before it was dumped into the gullies.

The sanitary landfill is now completed, and its multipurpose objective has been fully carried out. Agricultural land has been reclaimed; it not only looks good but is worth more—about $100 more per acre. And damage to the highway has been halted and corrected. According to Joe Smoot, an engineer for the Texas Highway Department, the cost of highway repairs in the landfill area went down from $60,000 to $3,400 during the 3-year period.

For 3 years Big Spring had a suitable site for its trash. The cost of operating the fill had been less than $1 a ton. Big Spring citizens, enthusiastic over the project, had hauled much of their solid waste to the landfill themselves. The city has secured two other sites for future solid-waste disposal.

This project was one of the first in the United States in which agricultural land was reclaimed by using municipal waste. It won the Fort Worth Chamber of Commerce Conservation Award for 1970. ♦

(Top) Shown here is the site of the Big Spring sanitary landfill. City wastes filled both gullies over a 3-year period. (Bottom) Cows graze where once they wouldn't tread. The formerly gullied area is now pastureland.


To Big Spring
U.S. 80 - Interstate 20
Gully No. 2
Gully No. 1
Property Line
Beals Creek



conservation in action

Instant trees—not quite

In Muskegon County, Michigan, people shake their heads in disbelief at the results of a land-reclamation project that 28 years ago was intended as an instructional exercise in conservation.

In 1943, Fruitport school children planted pine trees in a barren, sandy 50-acre parcel of tax delinquent land given to them by the Michigan State Land Office Board.

Most of the land was severely damaged by wind erosion. "Blowout" areas were numerous, and many exceeded 10 feet in depth. The children reforested these "blowouts" without any furrows because it was impossible for a tractor to get traction in the unstable sand. Consequently, some of the tree rows are anything but straight and parallel. But this hasn't hampered the ability of the trees to control sand blowing.

Some of the townspeople in the school district who plowed furrows for the trees in the loose, shifting sand said the seedlings would never grow. But they did.

The survival of the trees, considered so dubious, was insured by the diligent care of school children over the last 28 years.

Today, 12 pulpwood cutters are earning as much as $40 a day thinning the school's plantations.

Both the Soil Conservation Service and the North and South Muskegon soil conservation districts helped the Fruitport school children in their tree-planting program. The two districts donated half of the trees for planting. They signed up 60 schools in Muskegon County as cooperators. These schools have since consolidated into six major school systems, and all six are district cooperators.

SCS explained to the school children why different tree species are planted in certain soil types and told them about the importance of trees to wildlife, recreation, and the total environment.—WOODROW H. BARCLAY, *area conservationist, SCS, Grand Rapids, Mich.; and* HENRY DIERKING, JR., *district conservationist, SCS, Muskegon, Mich.* ♦

John Jenkins (left) and Frank Campbell cut pulpwood in a red and pitch pine plantation. This is the first thinning of the Fruitport Consolidated School forest in Muskegon County, Michigan, which was planted by students and parents 28 years ago. At that time this was an area of bare sand ridges and deep "blowouts." Trees now are 6 to 10 inches in diameter and 35 to 40 feet tall.

Trees are for people

Harold Engstrom has trees that attract people from miles around, winter and summer.

Engstrom has a ranch near Camino, California, in the foothills of the Sierras. Part of his ranch is a Christmas tree plantation that he calls "Santa's Acres." Here he sells Christmas trees on a "choose and cut" basis. Pine, fir, and Sierra redwood are available in various sizes. Seedlings reach salable size in about 4 years. Engstrom says, "Countless people—both children and adults—have told me how much they enjoy selecting and cutting their own Christmas tree."

On another part of his ranch,



Engstrom has set up day-camp and picnic facilities. This is an area of pine and fir stands. In summer, it is always cool and inviting and makes an ideal recreation area for people of all ages.

Engstrom has followed carefully the advice of the Soil Conservation Service in planning his wooded areas for people. And people, especially from the nearby Sacramento area, which has a population of more than half a million, appreciate his efforts in providing them with open space and outdoor recreation.—ROBERT A. DELLBERG, *former state forester, Berkeley, Calif.* ♦

Rainstorm proves a point

A severe rainstorm last May has provided some preliminary data on the success of conservation measures in the 4,000-acre Shobe Canyon drainage area in northern Oregon.

The storm caused an average loss of 10 tons of soil per acre on cropland protected by conservation work. Soil loss on unprotected or poorly protected land averaged 150 tons per acre. In some areas all topsoil was washed away.

Most of the work is being done with cost-sharing under the Rural Environmental Assistance Program of the Agricultural Stabilization and Conservation Service. Improvement of the Shobe Canyon channel is proposed as a measure in the Columbia-Blue Mountain Resource Conservation and Development Project. ♦

Scattering Fork watershed wants wildlife

Biologists with the Illinois Department of Conservation and the Soil Conservation Service are working with landowners in the Scattering Fork watershed in Illinois to establish a lush alfalfa-brome seeding along an improved channel and to plant additional wildlife shrubs in other areas.

Twenty landowners have agreed to work out a wildlife plan for their farms. Each plan varies but in general includes the planting of shrubs, such as autumn olive, silky dogwood, bush honeysuckle, and multiflora rose, and pine trees on both sides of the improved channel and in other odd areas of each farm. The Illinois Department of Conservation is furnishing a tree-planting machine to make the task easier.

These landowners and others will also cooperate with drainage districts to maintain a strip of alfalfa and bromegrass nesting cover, 15 to 30 feet wide, on each side of the channel. It is hoped that the plantings will attract pheasants, rabbits, ground nesting songbirds, and other small game to the Scattering Fork watershed.—JOE FASIG, *district conservationist, SCS, Tuscola, Ill.* ♦

Israel's top forester honored by AFA

Amihud Y. Goor, of Tel Aviv, founder of the first Department of Forestry and Forest Research Station and Arboretum in the Middle East, was conferred a top honor this month by the American Forestry Association at its 96th annual meeting in Seattle, Washington.

Goor received the Bernard Eduard Fernow International Forestry Award made annually by the American Forestry Association and Deutscher Forstverein of Germany.

The Israeli forester made a world study of soil erosion in 1938 as the first step in coming to grips with reforestation of arid zones. Visiting Nigeria, Sahara, Algeria, Morocco, the United States, Japan, China, Malaya, Java, India, and Ceylon, he compiled one of the first comprehensive studies of erosion control; the results were published by the Oxford Press, under the title, *A World Tour for the Study of Soil Erosion Control Methods.*

Goor also pioneered in the problem of sand-dune fixation under arid conditions and introduced the "deep planting" system, which is now standard. He also introduced and developed the "bare-hill planting" method that averted much of the erosion damage caused by heavy rains.

Goor personally collected and introduced from five continents many of the 1,000 exotic species chosen for trial at Israel's Experiment Station and Arboretum.

Africa, India, Asia, and North and South America have all benefited from the fruits of his research. ♦

Recon . . .

Trees are beautiful. "The aesthetic enrichment from the use of trees and shrubs in man's environment has long been recognized. Ancient people such as the Egyptians, Greeks, Romans, and Chinese were noted for the use of plants in everyday living.

"The United States lagged in developing aesthetically. The development of new land areas and the impact of industrialization and agriculture left little time for aesthetic advancement. Historically, as a country or civilization becomes older or better established, aesthetics become more a part of everyday living."—Dr. E. P. Lana, *head of the Department of Horticulture, North Dakota State University.*

Whale of a program. Secretary of Commerce Maurice Stans has designated Washington University, Oregon State University, Texas A&M University, and Rhode Island University as the nation's first Sea Grant Colleges, the maritime world's counterpart to Land Grant Colleges. The sea grant program was signed into law back in 1966.

Woodsy Owl was the guest of USDA Secretary and Mrs. Hardin at a press conference announcing that Woodsy will be the U.S. Forest Service's national symbol dedicated to combating pollution and improving the environment of forests, woodlands, and open lands. Woodsy and his "Give a hoot, don't pollute" will be featured in a national public service advertising campaign.

Four workshops for land-improvement contractors to improve management techniques and operational skills and to achieve higher profits will be held during February 1972 in Columbus, Ohio. This annual project, a cooperative undertaking of the Farm and Industrial Equipment Institute, the Soil Conservation Service, and the Land Improvement Contractors of America, covers virtually every aspect of the business of a land-improvement contractor. Information is available from the Farm and Industrial Equipment Institute, 410 N. Michigan, Chicago, Ill. 60611.

Down by the new channel. Trout Unlimited and the town of Vail, Colorado, have asked SCS to help "dechannelize" a stream. The channelization of Gore Creek by private contractors resulted in repeated flooding of part of Vail's new golf course, the loss of fine trout fishing, and a general eyesore. The SCS channel-improvement plan envisions building jetties out from the banks to create pools during low water, placing boulders along the banks to hold water and provide shade, and replanting the banks with grass and willow. If experimental work now being done proves successful, Vail will again have dry golfing and wet fishing.

Frost-free grapes. The demand for SCS technical assistance in Napa Valley, California, has increased with the rapid increase in the use of water for frost prevention of grapes. Fifty gallons of water per minute per acre are required for frost prevention. This has prompted the building of storage reservoirs in Napa Valley to insure an adequate supply to operate the sprinklers over large acreages of vineyards.

Survival of the fittest. Sinauer Associates, Inc., has published a game named *Extinction: The Game of Ecology*. Designed as much as a teaching device as a means of entertainment, *Extinction* is a simplified model of nature that incorporates strategy, competition, predation, environmental and topographical changes, and the impact of man on the environment into a game of species survival. *Extinction* was invented by Professor Stephen P. Hubbell of the University of Michigan; it costs $11.95.

Those were the good old days? "It is simply not true to say that the natural environment is worse off today than it was fifty years ago. On the contrary, today we have more and bigger and better managed forests than we had then, and in addition have developed the science of forestry . . . . We have game laws and virtually all our waters are stocked, and as a result have overall probably better fishing and hunting than could be found 70 years ago . . . . In this country, by contrast with others, the great majority of natural wonder spots and historic shrines are owned and preserved and managed for the public."—Lieutenant General F. J. Clarke, *chief of engineers, U.S. Army*. Remarks to the Red River Valley Associaton, Shreveport, La., April 12, 1971.

M. D. Burdick, state conservationist for Colorado, reports that one of Colorado's first RC&D flood-prevention projects has recently survived its first trial by water. In two heavy rainfalls on the 14th and 19th of August, flash flooding of the town of Walsenburg's commercial district was prevented by the Alessi Flood Prevention Dam. On the 19th, the dam caught and held 11 acre-feet of water, which is equivalent to the runoff from a 5- to 10-year storm. The Alessi Dam, completed in June 1971, is part of the Sangre de Cristo RC&D Project.

City wastes on the farm. Tests conducted by the Tennessee Valley Authority indicate that composting has major potential as an alternative means of waste disposal and not as a profitable soil amendment. Greenhouse tests showed that com-

posted municipal wastes increased yields, but these increases were not sufficient to pay for the cost of composting, hauling, and application. Another potential problem was that crops grown with compost contained higher-than-normal amounts of copper and zinc. Sustained heavy applications might lead to toxic levels of heavy metals in soils.

The U.S. Geological Survey is presently conducting a major study of the effects of underground waste storage on subsurface water systems and geologic structure. The major aim of the program is to develop enough knowledge to assess levels of risk and predict the effects of disposal schemes. The program, which will be ongoing, includes a number of specific projects, such as seismic monitoring of an experimental disposal well in Alabama and assessment of the problems of subsurface waste storage in the Ohio River Basin. Of particular interest to SCS will be the results of a planned study of the dispersion coefficient of underground waste through subsurface water systems.

The Connecticut Legislature passed an act reading: "Any planning commission, zoning commission, or planning and zoning commission of any municipality may use soil survey maps of the Soil Conservation Service of the U.S. Department of Agriculture as a standard in determining land use, planning, zoning, or development regulations."

The Frederick Soil Conservation District has received the 1971 Goodyear Conservation Award for Maryland, and Ernest E. Runkles of Mt. Airy has been named the "outstanding landowner-cooperator" in the district. The Frederick District will represent Maryland during a 4-day study visit to the Goodyear Farm near Phoenix, Ariz., in December.

Meetings

October

3-8 Water Pollution Control Federation, San Francisco, Calif.
Theme: Environmental Policy Administration and Legislation
Keynote speaker: Ronald Reagan, Governor of California

10-13 American Forestry Association, Seattle, Wash.
Theme: Toward Balanced Forest Use
Keynote speaker: Morris K. Udall, Congressman from Arizona

11-13 Future Farmers of America, Kansas City, Mo.

13-15 National Conference of Editorial Writers, Pittsburgh, Pa.
Panel: Environment: Fad or Fact of Life?

13-16 National Association of Biology Teachers, Chicago, Ill.
Theme: Emphasizing the role of biology education in the environmental crisis

14-15 American Forest Institute, St. Louis, Mo.

15-16 The Nature Conservancy, Savannah, Ga.
Theme and visit: Close look at the salt marshes, wetlands, and islands of the coast

16-20 American Bankers Association, San Francisco, Calif.

17-20 Farm and Industrial Equipment Institute, San Antonio, Tex.

17-21 National Association of State Foresters, Honolulu, Hawaii

18-22 American Society of Civil Engineers, St. Louis, Mo.

19-22 National Recreation and Park Association, Houston, Tex.
Keynote speaker: Rogers C. B. Morton, Secretary of the Interior

20-22 Association of Engineering Geologists, Portland, Oreg.

23-26 American Institute of Biological Sciences, Inc., Miami Beach, Fla.

24-28 American Institute of Planners, San Francisco, Calif.

25-28 American Water Resources Association, Washington, D.C.
Theme: Water Resources Development and the Environment

31-Nov. 2 Sprinkler Irrigation Association, Scottsdale, Ariz.
Panel: Role of sprinkler irrigation in the improvement of our environment

November

1-3 Geological Society of America, Washington, D.C.

3-5 National Water Resources Association, Dallas, Tex.

3-6 National Association of State Departments of Agriculture, Miami Beach, Fla.

5-9 Adult Education Association of the U.S.A., Los Angeles, Calif.

7-10 National Forest Products Association, San Francisco, Calif.

7-10 National Association of State Universities and Land Grant Colleges, New Orleans, La.

8-16 National Grange, Charleston, W.Va.

25-27 National Council for Geographic Education, Atlanta, Ga.

29-Dec. 3 Exposition of Chemical Industries, New York, N.Y.

29-Dec. 4 Western Forestry and Conservation Association, Portland, Oreg.

29-Dec. 5 National League of Cities, Honolulu, Hawaii

Review

Books

Leaders of American Conservation. By Henry Clepper. *1971. Ronald Press Company, 79 Madison Avenue, New York, N.Y. 10016. 353 pp. $10. (Sponsored by the Natural Resources Council of America.)*

This book is an alphabetized biographical compendium of the lives and careers of 360 men and women selected for "outstanding leadership in conserving our wildlife, forest, soil, and water resources" on the basis of nominations by one or more of the 40 member organizations of the Natural Resources Council of America.

Henry Clepper, the editor and one of the 121 contributors who furnished the biographical sketches, is chairman of the editorial committee of the Natural Resources Council.

In point of time, the list begins with John James Audubon and George Perkins Marsh and continues to present-day conservation leaders in government, business, and citizen conservation organizations.

Of the 360 conservation leaders listed in the book, four are women.

The book includes both the celebrated in conservation and the many people who have served the cause of conservation with great dedication but have never been accorded national recognition for their efforts. It is a handy reference list.—Katharine N. Mergen, *Information Division, SCS, Washington, D.C.*

Soil Erosion (Erozia Pody). By Dusan Zachar. *1970. Slovak Science Academy Publishing House, Bratislava, Czechoslovakia. 528 pp., illus.*

This book is an enlarged edition of a work with the same title, published in 1960. In comparing the two editions, the chapter on conception and classification of erosion phenomena has been substantially enlarged. The chapter on methodology of soil erosion research discusses four new groups of methods, and the chapter giving results of research in Slovakia has information on three new sites.

The author has divided his book into six chapters: Terminology and classification of erosion phenomena, the problems and methods of soil erosion research, the results of soil erosion research in Slovakia, the results of soil erosion research in Bohemia, analysis and summary of results, and soil erosion abroad.

Soil erosion is understood as destruction of soil through exogen geomorphologic factors. It occurs in natural conditons as well as in conditions altered by man. Man can influence the process of erosion both in a negative and positive sense, that is, either by its acceleration or inhibition. The author also considers artificial disintegration of soil, for example, by plowing, as soil erosion.

This book classifies erosion as surface erosion (exomorphous) and underground erosion (cryptomorphous). It contains a detailed classification of erosion as to its form and describes the stages of development of the different types and forms of soil erosion.

In the chapter on research problems and methods of water and wind erosion, the author gives attention to soil erosion intensity, to the influence of erosion on the soil, to the proneness of soil to erosion, to the effectiveness of erosion-control measures, and to the distribution of soil erosion and erosion control.

In the part of the book pertaining to soil erosion in Slovakia, the author presents his own research carried out in eight localities in regions of crystallic, flysh, carbonate (mostly trias), and loess rocks. He states that in Czechoslovakia precipitation erosion affects 2.93 million hectares, about 23 percent of the country; wind erosion affects about 1.63 million hectares, 12.6 percent of the country. Both kinds of erosion affect about one-third of the total land surface and one-half of the cultivated land. The rivers carry about 4 million tons of suspended load beyond the territory of the state.

The author gives a detailed discussion of the factors involved in erosion, especially precipitation concentrating mainly on so-called critical precipitation. He gives similar treatment to critical wind velocity.

As to conditons of erosion, special attention is paid to the relation of geology to the process of erosion. In the investigated localities, the susceptibility to erosion between different soil types varied even a hundred times.

Inclination, length, form, and aspect of slopes are investigated. The author establishes that if the length of the slope increases twice, the erosion intensity expressed by the rill volume increases from 1.3 to 6.6, a sharp increase in erosion being observed at short slope lengths.

In discussing cultivation, the author emphasizes the results of research, which show that the direct protection of the soil by vegetation is the most effective method of controlling erosion on cultivated land.

The last chapter is a short survey of soil erosion in other countries. The author points out that soil erosion is on the increase and

in some countries is the most important factor influencing soil utilization. He estimates that half a million hectares of surface soil have been destroyed. The continents with serious wind- and water-erosion problems, in the order of the seriousness of the problems, are: Europe, North and Central America, Asia, South America, Australia, and Africa.

This book has a scientific character and should be an important contribution to the solving of soil erosion problems. Much valuable data, illustrated by a great number of photographs, prove the author's vast knowledge and experience in this sphere.

The literature cited, about 700 Czechoslovakian and foreign publications, is a valuable addition to the book.

The book is written in Slovak and includes summaries in English, Russian, French, and German. It is designed as well for agriculturists, foresters, and hydrologists as for geographists, soil scientists, and meliorators. It can be useful to nature-protection workers and anyone interested in nature.—MICHAL LIZAK, *engineer, Forest Research Institute, Zvolen Research Station, Oravsky Podzámok, Czechoslovakia.*

New publications

The Economic and Social Condition of Rural America in the 1970's. Part 1. *1971. Prepared by Economic Development Division, Economic Research Service, USDA (for the Com. on Govern. Operations, U.S. Senate). 141 pp., illus. $1.* Study—first of a series and first of its kind—is an overview of the economic and social conditions of rural America. It contains five categories—population, income and employment, health and education, housing, and government services and facilities—that graphically compare rural regions with our metropolitan centers.

The Look of Our Land, an Airphoto Atlas of the Rural United States: the East and South. COMPILED BY SIMON BAKER AND HENRY W. DILL, JR. *1971. USDA Agr. Hbk. 406. 99 pp., illus. $1.25.* Airphotos illustrate land use patterns and terrain in five land-resource regions in the Eastern and Southern United States. Accompanynig the photos of each area is a brief description of land use, climate, soils, and topography of that area. This atlas brings together the text of Agricultural Handbook 296, *Land Resource Regions and Major Land Resource Areas of the United States.*

Leaders in Outdoor Education. EDITED BY ORVILLE E. JONES AND DOUGLAS E. WADE. *1971. Northern Illinois University, Lorado Taft Field Campus, Oregon, Ill. 96 pp. $2.* A listing of 412 conservation education leaders in the United States and Canada. Includes a working cross-section of leaders, some of their interests, and addresses. Entries cut across not only outdoor education but also conservation, resource use, and environmental education.

Feed Your Feathered Friends. COMPILED BY DONNA SUTHER. *1971. "The Britton Journal," Britton, South Dakota. 30 pp. $2.25.* Gives recipes and gourmet dishes for both the seed eaters and the insect eating birds; recommends food for injured or baby birds.

Plants—How They Improve Our Environment. *1971. Soil Conservation Society of America (7515 N.E. Ankeny Road, Ankeny, Iowa 50021) and Men's Garden Clubs of America (5560 N.W. Merle Hay Road, Des Moines, Iowa 50303). A Better Environment Booklet. 15 pp., illus. $0.25.* A color comic strip-type booklet designed for elementary grades. It encourages young people to plant flowers, shrubs, and trees and contains a number of do-it-yourself projects that can help children to understand better the function of plants in the environment. The booklet cleverly illustrates photosynthesis.

Tennessee Valley: Land and Its Changing Use. *1971. TVA Bulletin Y-27. 88 pp., illus.* Comprehensive study of land and soil resources and uses in the Tennessee River Valley; lays a solid factual foundation for future efforts to prevent land misuse. Profusely illustrated with maps, tables, and graphs. (Makes extensive use of data gathered by SCS's resource development and cartographic divisions.)

Environmental Thrust Handbook. *1971. USDA. [52] pp.* Outlines about 22 projects as potential environmental thrusts at the community level. Some of these are: Safe drinking water; sanitary landfills; trash and junk removal; land use planning; sewage disposal for farm homes and rural community; animal waste disposal; landscape improvement; protecting the landscape; pesticide safety; safeguarding food quality; disposal of pesticide wastes and containers; improving recreational resources and rural housing; and noise reduction.

Our Living Land. *1971. U.S. Dept. of the Interior Environmental Rpt., Conservation Yearbook Series, No. 7. 98 pp., illus., color. $2.* This is the 1971 Department of the Interior conservation yearbook. It outlines Interior's responsibilities as custodian of public lands and as a research organization providing information on which resource management decisions can be based. It is written for the layman but contains valuable information for the environmental expert. The color photographs and unusual graphics afford a rich supplement to the text.

The New Forest. BY W. G. JONES. *1970. Offset Centre, Inc., Boalsburg, Pa. 58 pp., illus., color. $9.50.* An account of the new forest coming up in central Pennsylvania on supposedly barren land once stripped for bituminous coal. Includes descriptions and color photographs of trees and shrubs that have reclaimed thousands of acres of rough, rocky land, with only a small assist from man.

An Outline for Teaching Conservation in Elementary Schools. *Rev. 1971. USDA PA-268. 14 pp.* Suggests an approach to the teaching of environmental conservation as an integral part of all subjects in the elementary school curriculum. Organized by grade levels and with a major theme for each level, the outline gives special attention to reinforcing generalizations developed at earlier grade levels. Under each grade level are three main divisions: (1) objectives; (2) things to talk about; and (3) things to do. The latter two contain suggestions for teacher-pupil discussion and activities.

Forest Farmer, Manual Edition. *1971. Forest Farmers Association (1375 Peachtree St., N.E., Atlanta, Ga.). 208 pp., illus. $7.* A layman's manual on how to grow trees for profit and esthetic enjoyment. More than 50 authorities in forestry and related professions contributed to the manual. Subjects include how the latest tax laws affect forest farming, keys to identifying trees, how to practice multiple use, how to make a timber sale, and a complete list of timber markets and sources of forestry information and assistance. New developments in every phase of forest farming are highlighted.





Wall-to-wall trees. *A windbreak is a valuable improvement to any farmstead. A windbreak brings relief from hot sweeping winds in summer and drifting snow in winter. In the above photograph, Marston Fitzsimmons is breaking the soil to plant a windbreak. The open, gently rolling landscape around his wheat ranch, near Pomeroy, Washington, offers no protection from the blowing winds. In the bottom photograph, 3-year old walls of foliage have brought protection, beauty, and—an added dividend—birds and pheasants to the Fitzsimmons ranchhouse.—Earl R. Baker, district conservationist, SCS, Pomeroy, Wash.*

From the Administrator:

Let's talk about trees

Conservation districts and the Soil Conservation Service have always considered all of a cooperator's land in developing conservation plans—cropland, pasture, range, and woodland.

The last category is no small item. A third of the land in the United States is covered by trees, and in some parts of the country, more than 85 percent of the land area is woodland. National forests and other federally administered public lands make up a considerable part of this total; nevertheless, about 462 million acres are industrial, state, and private lands. The bulk of this—300 million acres—belongs to 4 million private landowners.

Most of what is written on the value of trees focuses on their use for lumber and other wood products. But conservationists are aware that trees supply many other needs of man and his environment. Many of the first trees planted with SCS, CCC, and district help were primarily for halting erosion and healing its scars.

Trees were planted in the sandy blow areas of Vermont, Michigan, and the Oregon coast; on the eroded hills of North Carolina, Georgia, and other Southeastern States; and in the ravished reaches of the Great Plains.

Today, as then, trees, in addition to supplying building material and other products, are vital to the protection of soil and water resources. Trees beautify highways, shelter them from wind and snow, and reduce traffic noise. They soften the blasts of hot or cold winds, trap drifting snow, and add to the beauty and comfort of those who live on farms and ranches. A stand of trees can be habitat for wildlife or furnish people with recreation or scenic retreat.

Many district cooperators already have been helped in developing conservation plans that include their woodland, just as they have been helped with their crop, pasture, and rangeland as part of the total land area.

Such planning recognizes that forests are not just a one-use resource. They must satisfy many needs. The viewpoints of biologists, recreation specialists, engineers, and range specialists often are brought to bear, along with the viewpoint of the forester, in helping the owner decide on the best uses for his stand of trees. His decision also could include plans for planting more trees.

Despite all that has been done, Conservation Needs Inventory data on woodland are convincing evidence that much remains to be done. Many more of the 4 million woodland owners and much more of the 300 million acres of private woodland ought to be included in the broad conservation-planning effort. Only then will landowners and the public at large reap the fullest possible benefit from this increasingly valuable resource.

The 3,000 conservation districts covering most of the private land in this country, together with a comparable number of SCS conservation planning specialists, are in an excellent position to work cooperatively with forestry agencies in this important work.

Kenneth E. Grant

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RC&D - Part 1

SOIL conservation

November 1971, Vol. 37, No. 4

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RC&D's are home-grown products

The response to our request for articles from local non-government leaders of RC&D projects was so great that rather than try to fit all the articles in one issue of SOIL CONSERVATION we opted for two RC&D issues. November is "RC&D, Part I." Look for Part II in December.

This month's articles span the country from Connecticut to Nevada, and each article makes evident that RC&D projects are a real force in community development.

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20205.

CLIFFORD M. HARDIN, Secretary of Agriculture
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RC&D—cure for an ailing lake

by Al Rose



The author: Al Rose of Camden, Arkansas, retired in 1968 as a newspaper editor but continues to write a weekly column that he started half a century ago. He serves the county hospital as public relations director and was appointed delegate to the 1971 White House Conference on Aging by President Richard M. Nixon.

(Mr. Rose died of a heart attack on October 31, 1971, after we had gone to press.—Ed.)

The area: The Southwest Arkansas Resource Conservation and Development Project area includes 12 counties: Calhoun, Columbia, Dallas, Hempstead, Howard, Lafayette, Little River, Miller, Ouachita, Nevada, Sevier, and Union. The topography ranges from forested coastal plains in the south to the Ouachita Mountains in the north.

While the really affluent people of southwestern Arkansas have access to private lakes and country clubs, most of us must look to public facilities for our outdoor recreational needs. But public facilities are too few here at home, and limited leisure time or restricted income keeps many Ouachita County residents from enjoying faraway places. That's why I am excited about our Bragg Lake Recreation Park—it is in spittin' distance of a third of our people.

Bragg Lake dates back to the mid-thirties when the T. J. Gaughan family donated 280 acres of land to the county for recreational use. County labor and road equipment were used to build the dam, and for a few years the lake was quite an attraction. It was used heavily by local people and brought many visitors from northern Louisiana and eastern Texas before larger lakes were built in those areas.

Facilities at the lake are all now badly deteriorated. And the lake itself is infested with lotus and other aquatic weeds that limit its value for both boating and fishing.

County officials saw the need for a local recreational development, but with a limited tax base, they simply couldn't bear the cost alone. Then last year Ouachita County was added to the Southwest Arkansas Resource Conservation and Development Project area, and we saw a ray of hope. When project sponsors approved our plan for a recreational park, thus insuring the needed cost-sharing, we lost no time in moving ahead.

The park area, all owned by the county, includes 55 acres of woodland and a 225-acre lake. Facilities planned include a paved access road; a footbridge over the spillway; picnic tables and grills; campsites; boat-launching ramps and docks; water supply and electrical power systems; and sanitary facilities.

The total cost of the project, including erosion-control work, is $106,000. This figure includes the value of the county owned land—$56,000. RC&D funds for the project amount to $23,780.

Most of the 5,420-acre watershed in which Bragg Lake is located is rolling hill country and is expected to remain in mixed pine and hardwood forest. The Ouachita Soil Conservation District will assist landowners in carrying out a management program to fulfill timber, wildlife, and recreational needs. The Arkansas Forestry Commission is making a major contribution through its fire prevention program, distribution of tree planting stock, and pest control assistance to protect landowners in the watershed. Managing fish populations and stocking will be handled by the State Game and Fish Commission; the county will take care of maintenance through use fees yet to be established.

Located only 8 miles from Camden, home of more than half of the county's 31,000 residents, the park will be used heavily by local people and is expected to attract some 12,000 additional visitors annually. During the period of peak use between mid-April and Labor Day, we expect to have as many as 300 visitors per day.

No doubt about it, Bragg Lake Recreational Park will be a major asset to our area and a real bonanza for the average fellow. It just goes to show what can be done when people work together and don't worry about who gets the credit. ♦

Hohokam—hope for the desert

by Robert L. Tyson, Jr.



The author: Robert L. Tyson, Jr., owns and operates a farm in the Laveen area, southwest of Phoenix. He is chairman of the Hohokam Resource Conservation and Development Project Steering Committee, a supervisor of the Agua Fria-New River Soil Conservation District, treasurer of the State Association of Soil Conservation Districts, and a member of the Arizona Council of Resource Conservation and Development Projects.

The area: The Hohokam Resource Conservation and Development Project area includes all of Maricopa County in central Arizona and part of Pinal County to the southeast. Maricopa County covers more than 6 million acres; its population is 963,132, more than half of which is in Phoenix, the state capital.

(Hohokam is not yet a full-fledged RC&D project. Its application for planning assistance from the U.S. Department of Agriculture is pending.—Ed.)

If people really want something, they aren't easily discouraged from getting it by a handicap or an obstacle.

This is the way it has been with our Hohokam Resource Conservation and Development Project in Arizona. It has been operating for 3 years now without federal funding. That's a mighty large chunk of money to do without, but sponsors decided to do as much as possible with local and state funds.

So far, we have managed to complete six project measures. We have 24 in progress, some in planning, and others temporarily tabled.

Our RC&D project came about after six soil conservation districts within Maricopa County formed an association to solve common problems. At that time, the districts didn't have any other way of collectively solving widespread problems like flooding and lack of recreation.

The Maricopa Association of Soil Conservation Districts recognized RC&D as a valuable tool and shortly formed a liaison with cities, towns, organizations, and districts in the area to organize the Hohokam RC&D Project.

As of now, the project includes the Maricopa Association, two cities, three towns, three irrigation districts, a development association, and two Indian communities.

We are running the gamut of project measures—from saving an old ironwood tree to building small watershed flood-control structures. Most project measures concern flood protection, community development, public road and utility improvement, employment, environmental cleanup, and scenic, historic, and recreational development.

We have established a liaison with our state legislators and are pressing for needed flood-plain zoning regulations. We are presently trying to get legislation that will permit us to form flood-control subdistricts based on watershed boundaries.

Some project measures are moving along, despite lack of federal funds, mainly because of much outside assistance. One community development project measure completed by the Arizona Public Service brought electricity to the Tonto Basin rural area. The Arizona Public Service spent more than $185,000 to provide electrical power to about 185 customers.

Another community development project involved much more outside assistance, simply because one group could not handle all the problems. We requested assistance for Allenville, a small black community southwest of Phoenix, which has substandard housing, poor quality and low-volume domestic water supply, poor public roads, poor recreation areas, and no day-care center for working mothers.

Allenville's main street is now paved, a day-care center built and staffed, and a new domestic water well drilled. Several new homes are under construction.

Our countywide projects, such as recreation for Maricopa County, also demand a great deal of agency cooperation. Presently, the U.S. Army Corps of Engineers, the Arizona Game and Fish Department, the State Parks Department, the Bureau of Indian Affairs, the Gila Bend Soil Conservation District, and the Papago Bend Development Commission are working on a project measure to turn a borrow area into a lake. The borrow area is filled with seepage from a nearby dam. The Corps recently tested a nearby well that will be used to maintain the desired level in the lake. If the well water is suitable for fish and wildlife, plans are to install camping and picnicking facilities.

Some project measures progress piecemeal. They are worked on whenever funds are available. For example, there was a real need for a good farm-to-market road from Hyder to Sentinel where it could connect with U.S. Highway 80. The Hyder area is highly developed agriculturally, but getting produce to market was difficult because of a narrow, winding desert road. The







(Top) The Hohokam RC&D Project Steering Committee wants more desert areas opened to the public for recreation use.
(Middle) Irrigation efficiency and water management are priority measures of the Hohokam Project.
(Bottom) When the Agua Fria-New River flood-control measures are installed, residential areas in and around Phoenix will be safe from floods.

Maricopa County Highway Department agreed to help by straightening as much as possible about 18 miles of the road and then paving it. Now farmers find it easier to get their produce to market.

Other project measures, watershed projects under the federal Public Law 566 program, are pushed ahead as far as possible without federal funding. Then they come to a standstill. The town of Wickenburg, for example, paid about $50,000 for technical help in planning a Public Law 566 project, sponsored by the Hohokam RC&D Project. The planning is almost completed, and we will soon have to rely on federal funds to finish the work. Thus, despite our progress, there is still need for federal funding.

Until we bridge this obstacle of funding, we'll be like the tortoise racing against the hare. It may take us longer to get where we want to go, but, eventually, we'll reach our goal. ♦

Total planning in Connecticut

by Dorothy C. Goodwin



The author (shown above with a student on University of Connecticut campus): Dorothy C. Goodwin, a native of Connecticut, is assistant provost and director of institutional research at the University of Connecticut in Storrs. She holds the title of associate professor of economics at the university. Miss Goodwin serves as secretary of the Eastern Connecticut Resource Conservation and Development Project Committee and is a member of the Mansfield Community Development Action Plan Coordinating Agency.

The area: The Eastern Connecticut RC&D Project covers three state planning regions: Northeastern Connecticut, Southeastern Connecticut, and the Windham region. The project is sponsored by Connecticut's Department of Environmental Protection.

Until recently, the great population magnet of Mansfield was the University of Connecticut in the village of Storrs. A major industry, the university generated problems of housing, sewerage, and transportation, necessitating services never previously needed so badly in Mansfield.

Needs for these public services converged suddenly. Expenditure of time and money to meet these needs might well have obscured an even more crucial pressure: expanding urban sprawl from New York and Boston. To meet demands of present and future, it became apparent that some sort of total planning was needed. This is being accomplished by public action increasingly through the Eastern Connecticut Resource Conservation and Development Project.

The total planning concept as experienced in Mansfield has three interesting facets: environmental corridors, interaction between RC&D and the Community Development Action Program (CDAP), and creation of an environmental impact team.

The environmental corridor, useful in a large area undergoing transition, is simply a belt of land sharing characteristics that make uniform policy on its use desirable. This could be a "streambelt," a stream with its adjoining marshes and wetlands; a highway, with its dynamic relationship to land; or transmission corridors, open swaths cut through the woods around powerlines. The environmental corridor concept was developed by RC&D as a tool for land-use planning on a regional scale. It has been extremely valuable to us.

The second thrust of RC&D work in Mansfield has been technical assistance to CDAP, whose programs are organized and funded by the state and the federal government after application by a town has been approved. CDAP coordinating agencies are composed of local townspeople. I served on the Education, Housing, and Economic Development Committees for Mansfield's CDAP.

CDAP is not a planning and zoning commission. It takes a broad approach to planning, incorporating education, social services, town government, housing, utilities, transportation, and economic development into a land-use plan designed for the future.

Technical assistance from RC&D in formulating Mansfield's land-use plan was, frankly, beyond valuation. William Lucas, the RC&D project coordinator, was also chairman of the land-use committee of CDAP, a circumstance that was most useful.

Because of Eastern Connecticut RC&D's constant association with CDAP, the RC&D became aware of total planning values. The RC&D took into account communications, preserving neighborhoods and historical districts, and maintaining the character of communities—considerations not always included in planning that simply looks at spatial relations.

The most important ways RC&D and CDAP have come together have been in the interdependence of housing, utilities(especially sewers), and transportation, including roads. Mansfield's land-use plan was a beautiful example of uniting RC&D information about land with requirements of *people* for housing, sewerage, and transportation. What the CDAP-RC&D process did was to put *people* on a land-use map.

The Mansfield plan was formulated over a 2-year period. Recommendations were organized by subject and year of suggested implementation. Our plan deals with recommendations such as a new library, a new town hall, and new sewers. But these particulars are founded on a total view of conditions in Mansfield. After adoption by the coordinating agency, the plan was adopted by town meeting with one small change.

The plan now goes to various town boards and commissions for implementation. Future develop-



charged for this service.

Developers have responded enthusiastically. They know they can enhance their reputations by producing a good development for the same amount of money.

The environmental corridor concept, the coordinated town planning activity, and the environmental impact team are responses to mounting growth pressures in eastern Connecticut. Some people here don't want this kind of growth. They want this area to remain a beautiful woodland. But people are here, and there must be houses for them.

Town zoning commissions alone cannot plan for the future. We need total and comprehensive planning. For the first time in history, we are recognizing that it's all one package. ♦

ment of this community will be guided by principles of the plan and technical advice of the RC&D.

The RC&D project will be a major input in the laying out of Interstate-84, the new highway being planned through Mansfield. This highway must do minimum damage to streambelts, houses, and farms.

In connection with total planning, I would like to mention the role of the environmental impact team, whose services I feel are the most important contribution of RC&D. The idea for such a team came about in response to a serious situation in the southern part of the project area, where some housing developments could have turned out better without additional spending. Buildings could have been better sited, access handled better, layout on the sites arranged better—all this without costing the developer more money.

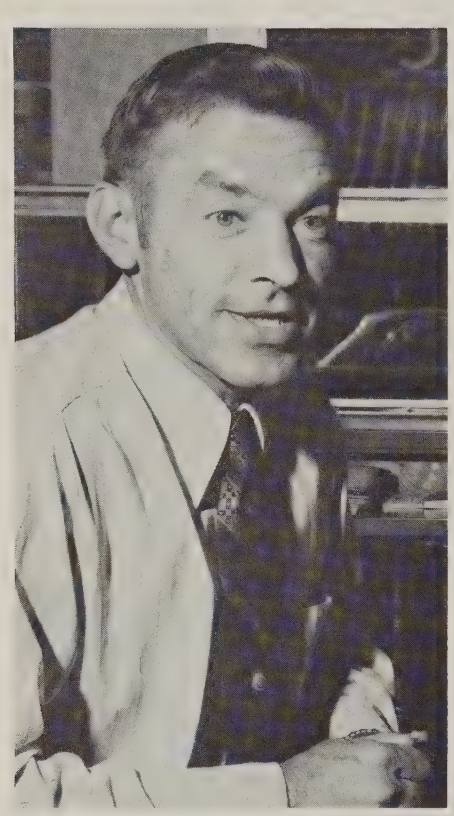
To meet the problem of inefficient developments, RC&D makes available a team of advisers to developers who request help. This team consists of site planners, sanitarians, geologists, civil engineers, landscape architects, soil scientists, biologists, and others. No fee is



(Top) Urban development near New London, Conn., is moving across previously untouched forests and fields.
(Above) Areas of natural beauty are not incompatible with urban development, if the development is planned with farsightedness.

A people's project

by Chuck Ehm



The author: Chuck Ehm is a bank vice president in Creston, Iowa, and serves as chairman of the Southern Iowa Resource Conservation and Development Project. He is a former extension director of Union County.

The area: The Southern Iowa RC&D Project spans a predominantly rural area of seven counties in southwestern Iowa—Ringgold, Adams, Taylor, Adair, Union, Decatur, and Clarke. Some of the corn for which Iowa is so well known is grown there, but much of the rolling, hilly land is better suited to pasture.

Curiosity. That seems to be what has kept our Southern Iowa Resource Conservation and Development Project going.

It's been 3 years since we first began talking about RC&D, and even now many of us wonder just how far we can go.

The Southern Iowa Project was approved only recently for federal funds, so most of our programs have been financed locally. Nevertheless, we've developed an understanding of what RC&D is. We've got spirit—a kind of spirit that's a little surprising.

Even though there aren't many tangible results yet from our RC&D project, people are interested; many come to our meetings. And we've broken down county barriers. A county no longer hesitates in giving other counties helpful tips on community improvement.

People, in the beginning, feared that federal funds would not be split equally among the counties and that Creston, the largest town in the area, would benefit most from the project.

All that is changing. We realize that we have to depend on one another. The general feeling coming across is that when one town is improved the entire area is improved.

We're doing everything we can to get a balanced program. Committees include farmers, businessmen, and professional specialists. We meet in Clearfield, a town of 500 people, rather than in a large town to help convince people that RC&D is honestly areawide. It's got to be this way if we're going to stabilize the population in this area.

Look at Arispe. Ten to 15 years ago, it had two gas stations, three auto repair shops, a car dealer, a grocery store, a hardware store, an implement dealer, a high school, a tavern, and some other facilities. Today, it has only one gas station, one auto repair shop, a grocery store, a tavern, and an elementary school. This kind of thing is happening all over the area, and we hope RC&D is a way of stopping it.

We have other problems too. Tests show that 75 percent of the wells in one of our counties are contaminated and that the water is unsafe for drinking. This could be true in the other counties. We know we've got to have good water, and many of our towns are including municipal water supply in RC&D proposals. Afton, Creston, and Corning are planning to get municipal water from watershed reservoirs that are being built. And Greenfield and Fontanelle plan to share a water-supply source.

We know we have resources in the area. Our seven counties are producing everything from aluminum castings for jet nose cones to garters and women's undergarments. One of our best opportunities is to develop cow-calf herds for beef production. Converting steep land to lush pastures is part of our agricultural improvement program, which Ted Howe, a Greenfield banker, calls the backbone of our RC&D project. The agricultural improvement committee figures that reaching half the pasture-improvement goals could boost area income by $3 million. Ted points out that good land treatment means a better water supply for towns.

At first, project proposals were slow coming in. People didn't understand RC&D. But after newspapers and radio stations explained it, we were flooded with ideas.

Towns wanted sewer systems and sanitary landfills for solid waste. Each county came up with recreation projects, many involving lakes.

All seven counties submitted plans for county planning and zoning. Beautification projects, such as revamping Greenfield's town square, were proposed. One farmer suggested that an industry be set up to make wood chips from trees cut down in timber-clearing projects.

Industrial development, runway surfacing at airports, and an outdoor classroom for Southwestern Community College were among other proposals.



You don't have to be big to be a winner. Clearfield, Iowa, is a small town with plans for improvement, sparked by the Southern Iowa RC&D Project.

So far, a cattle improvement association has been formed; a tourism brochure has been printed; and a water-treatment plant has been installed at Greenfield. The Iowa Department of Health has helped Clarke County hire a nurse; the Office of Economic Opportunity is helping pay the cost of a "Meal on Wheels" catering service for the aged in Leon; and a nonprofit day-care center has been set up in Union County to care for small children whose mothers earn a low income.

Many of these projects were underway before RC&D, headed by community leaders now serving on RC&D committees. Dale Juergens, a Clearfield banker, is helping to get people together on RC&D projects to avoid duplication of effort.

We feel fortunate in having the services of resource specialists like Herb Kayser, the RC&D project coordinator, and Bob Louden, an SCS soil conservationist. We'll get a forester soon. We wouldn't have these professionals helping us develop our area without an RC&D project.

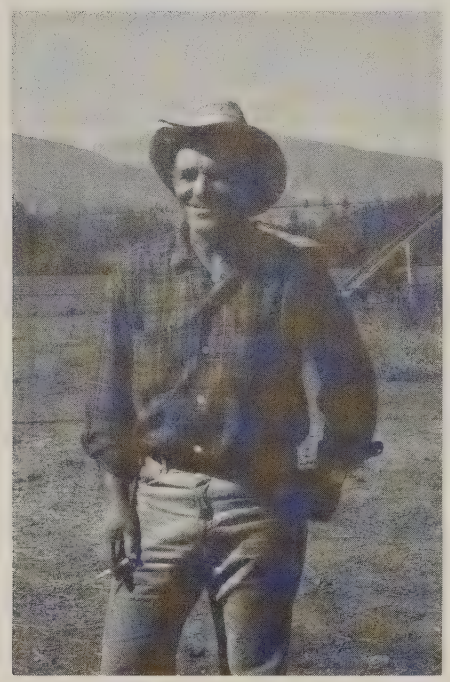
We think we've done well so far, but we're now ready to step up the pace. We have three project measures to give us a "shot in the arm" if we can get RC&D funds: a silt trap to protect Taylor County's Windmill Lake; a lake near Garden Grove to be used for recreation, flood control, and supplemental town water supply; and a small structure near Prescott to stop the flooding of the town's main street. We're enthusiastic about these projects, and we're looking for ways to get financial help.

People know now that an RC&D project is a source of help on a variety of problems. When a downpour flooded Creston Junior High School and several private properties, it took only a few days for people to ask that a remedy for the flooding be included as an RC&D proposal.

That's the kind of response we've wanted. Now all we have to do is make certain we have the organization and cooperation it takes to follow through. We think we do. ♦

Sweet smell of success in Bitter Root Valley

by Jack Iman



The author: Jack Iman, a lifelong resident of Montana's Bitter Root Valley, is a rancher and president of the Montana State Grange. His 580-acre ranch is 4 miles north of Hamilton. He serves the Bitter Root Valley Resource Conservation and Development Project as chairman of the Ravalli County Program Committee and vice chairman of the Project Program Committee. He has been on the Ravalli Soil Conservation District Board for 20 years.

The area: The Bitter Root Valley Resource Conservation and Development Project takes in the entire watershed of the Bitter Root River in southwestern Montana. The area covers all of Ravalli, Missoula, and Mineral Counties. Total acreage is 3,981,700. More than 50 percent is state and federal land.

Want a vest for your Volkswagen? Need shoes for your mule? Write, call, or come to Bitter Root Valley. We've got 'em.

We also have the technical expertise needed to convert from surface irrigation to sprinkler irrigation. Such a conversion, in some instances, has more than doubled hay and wheat yields, while markedly reducing soil erosion.

The Bitter Root Valley Resource Conservation and Development Project has brought us this expertise, has brought us local industry, and is helping to bring us better communities.

If anyone asks me what I consider the outstanding accomplishment of this RC&D effort, my answer is: a rekindling of community spirit—a renewing of that oldtime feeling that all residents of our valley are interwoven in their economic lives, their resources, and their social and educational values.

Since RC&D entered our lives 6 years ago I think that we talk to each other much more than in the past; we've found that RC&D committees are a neutral ground where we can talk. We are just a group of people trying to find a solution to a problem. When approached this way, the problem seems much simpler.

In the beginning, most people thought that agriculture was getting the most attention, the lion's share of RC&D. The Agriculture Committee was the first established, but about 90 percent of the project proposals we've had in the last 6 months have had little to do with agriculture.

Much of the credit for what we consider to be real progress must go to Clarence Popham, the chairman of our RC&D Program Committee. He holds to two principles: (1) No proposal is preposterous or unfit for action. (2) Any proposal can succeed if those most directly affected are willing to work.

One of our early projects was directed at helping seven landowners in the Home Acres Community Irrigation System change from surface to sprinkler irrigation. Their old method was inefficient; it wasted water, created wet spots in the valleys, and caused erosion in the coarse-textured soils.

Marvin Costello, one of the landowners, recalls that one of his fields had "truck-sized" gullies when he was using surface irrigation. He could plant only 11 acres, and his hay yields were about 1 ton per acre. After $250 worth of bulldozing and conversion to a gravity-powered sprinkler irrigation system, Costello plants 16 acres of hay and harvests 5-ton crops.

Our small-industry committee and its activities have been one of our most successful efforts.

Take Cranston Plastics, for example. In 1967, Ivan Cranston and his wife, Helen, developed a lightweight sportsman's safety kit. They had a product and a production line but needed markets and money. The Bitter Root RC&D was asked for help, and the Cranstons got what they needed.

This 5-year old industry at Stevensville employs five people. It has an established market in Montana, Idaho, and parts of Washington, Utah, and the Dakotas. Annual sales gross about $100,000.

"Vests for Volkswagens" is no joke. There really is such a product. George Stevens of Missoula manufactures removable vests for VW owners who want to protect the painted surface of their cars from damage caused by the pelting of small stones. In the West, highway crews often spread sand rather than salt on icy roads. The sand—really small pebbles—can scratch up VW's, which have large painted areas close to the road.

Forestry is one of our major enterprises, and many folks in the valley are employed by forest industries. Our RC&D project has helped find manufacturers and markets for some of the by-products of the basic industry.

For example, Ted McNinch, near Florence, makes posts and poles

that find their way to highways as guard-rail posts, to the Forest Service who needs sign posts and cabin material, and to lumber dealers. Ted's raw material is lodgepole pine, often the smallest tree in a commercial timber cut and thus an unwanted product. Ted has found a use for a locally grown resource that might otherwise go up in smoke during a slash burn.

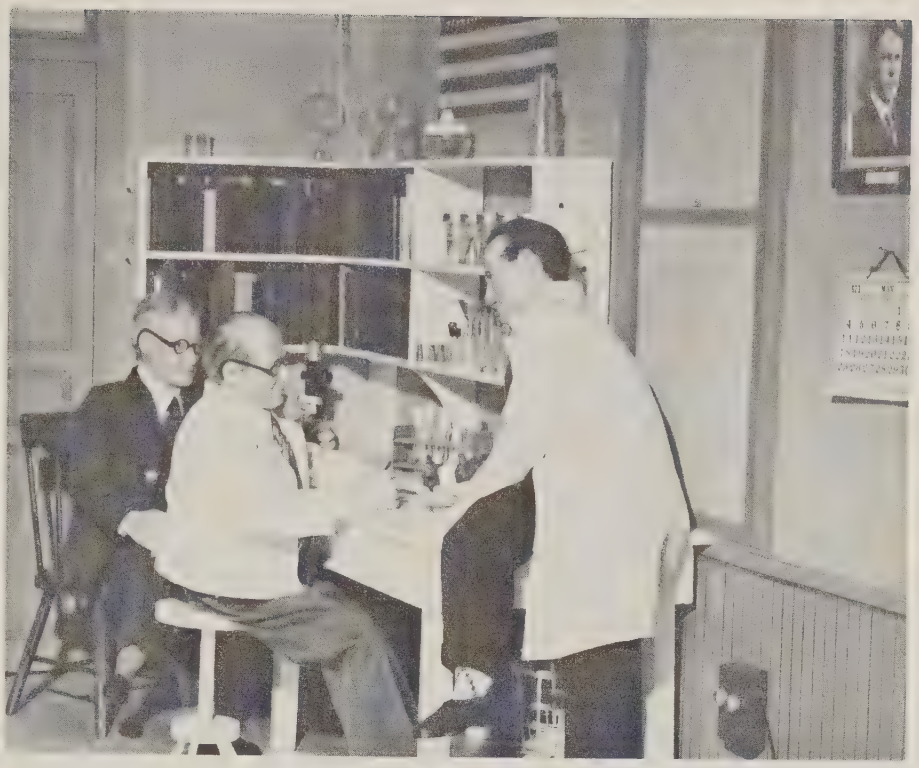
Bill Snedigar's mule shoe operation is another small industry in our area. As far as I know, Bill is the only maker of mule shoes in the United States. His unique business is furnishing a quality shoe that stubborn mules can't throw off on mountain trails. Bill is also a supplier of quality horseshoes, trail tested in mountainous terrain.

Bitter Root was the first valley settled in Montana. Settlement was started by a Jesuit order headed by Pierre-Jean DeSmet. The valley soon flourished. Now more than 130 years later, Mrs. Marion Gebhart, school librarian in Stevensville, and her committee of 12 local amateur and professional historians have captured the color found in early diaries, legends, and photographs in a book, *Montana Genesis.*

To aid the writers in this effort various RC&D committees helped locate oldtimers who had firsthand knowledge of the area's history.

Nestled in the Bitter Root Valley is a U.S. Public Health Service laboratory, one of five in the United States. The laboratory is one of the valley's largest employers. Its primary work is doing research on animal diseases related to humans, such as encephalitis, spotted fever, and rabies.

The early work at the laboratory, however, is the current concern of valley residents. In the early 1900's the Bitter Root Valley was the center of a strange disease that resulted in high fever and nearly 70 percent mortality. To study the disease the state of Montana set up a laboratory in Hamilton. The disease was labeled Rocky Mountain spotted fever. In 1906, Dr. Howard Ricketts established the connection between the disease and ticks. A vaccine was later developed, and since then only one death from the disease among vaccinated people has been reported in Ravalli and Missoula Counties.



This diorama in the Ricketts Memorial Museum in Hamilton, Montana, shows three scientists discussing their work on spotted fever vaccine. The museum has the backing of the Bitter Root Valley RC&D Project.

Dr. William Jellison, a parasitologist who worked at the laboratory from 1929 to 1962, determined that this early work should not be lost to history. He and his wife purchased the old converted schoolhouse where the early spotted fever work was done.

Some fine effort on Dr. Jellison's part and some assistance from the RC&D office have brought recognition from the National Park Service. The old laboratory on Canyon Creek is now designated a national historical place. Dr. Jellison and RC&D members have high hopes for the future of this museum. It is a quality educational project.

Educators like Duane Walker, John Smith, Ron Skelton, and Charles Larson are frank in admitting that our school's first thrust into environmental education came from the RC&D Education Committee. This committee stirred community interest and brought us a Title III grant of $47,000 for environmental education. This funding has resulted in environmental teaching that is heavily centered around firsthand experiences with the environment—outdoors.

Doris Milner, a Bitter Root Valley resident who describes herself as an environmentalist by way of her activities in the League of Women Voters, the Wilderness Association, and several other allied action organizations, sees RC&D as providing a neutral atmosphere where controversies between people of varying interests can be worked out. "It has to do this to serve its purpose," she says.

The future of our RC&D project is bright. Recently we took in an area that nearly doubles our original size. Some folks worry that our efforts will be diluted. I prefer to think that our opportunities have just been doubled. ♦

We're still splitting rails in the Lincoln Hills

by Raymond J. Schulthise



The author: Raymond J. Schulthise is executive vice president of the Citizens National Bank in Tell City, Indiana. He is treasurer of the Lincoln Hills Resource Conservation and Development Project Committee and has served as president.

The area: The Lincoln Hills Resource Conservation and Development Project, the first in the nation, became operational in October 1964. It takes in the 1,005,440 acres of Spencer, Perry, Crawford, and Harrison Counties.

My home has always been here in southern Indiana, which was Abraham Lincoln's home from 1816 to 1830. The area has been good to me, so it's a privilege to do something for the area when it needs help.

I have been associated with the Lincoln Hills Resource Conservation and Development Project for 7 years. I can remember one of our first RC&D meetings back in 1964 when I quoted declining census figures. Our four Lincoln Hills counties had been plagued by an outmigration of people for 70 consecutive years.

The trend has since reversed: the 1970 census reported more than 64,000 people in Crawford, Harrison, Perry, and Spencer Counties—an increase of 4,000 since 1960.

Why is Lincoln Hills today a better place to live? People and programs have brought improvements —programs like our RC&D project and its 438 measures that have changed our way of using land and water, especially forestland.

We began to make progress when our RC&D project sponsored demonstrations in timber resource development for local foresters, woodcutters, and sawmill operators.

One demonstration brought the first modern logging equipment into this heavily wooded area. Today, many local forest owners and mill operators are using rubber-tire skidders. Sawmills have mechanized beyond 1964 dreams. Several individual mills now handle more volume in board feet than 20 mills did before we had an RC&D project.

And sawmills are much neater and safer now, with modern debarkers cleaning the logs. Every bit of excess slab is chipped in a huge woodhog; the chips are sold to three new local industries, mostly for paper products. The wood-chip business, alone, brings about $850,000 to the area every year.

We also have sponsored highly successful sawmill clinics, woodgrading courses, Christmas tree management demonstrations, maple syrup institutes, and, perhaps most important, tree planting and erosion-control projects. We've planted more than 5 million trees and wildlife plants on about 7,000 acres, including 6,500 acres of gullied land.

If it's true—and I think it is—that 20 tons plus of soil per year were lost off this area before RC&D then this new tree acreage certainly is preventing a lot of erosion and stream pollution.

Our RC&D project is bringing us substantial economic gains. Nearly all banks in the area have tripled



in deposits since 1964.

Earlier, I mentioned the new wood-chip business. There are five other new wood-using industries in the area — making paper, flake board, mulch, and furniture.

These companies, coupled with earlier existing wood industries, now employ 50 percent of all our industrially employed people.

Forest resource development and improvement has brought us an extra dividend—more game, especially deer and wild turkey.

And the four-county water-impoundment program, under RC&D leadership, has resulted in numerous small lakes. They are literally everywhere, serving many purposes, including game habitat. The lakes also have multiplied opportunities for fishing and other water recreation a hundredfold.

So we've done a lot with our land and water and trees. But we're not finished yet. We have many attractions for industry: manpower, electric power, and water. But adequate roads are lacking. Our 30-year-old roads were not built for large, heavy trucks. Right here in Tell City we are 100 miles from the nearest interstate highway.

Much can be done if our people —especially our young people—remain in the area and pull together. In the Lincoln Hills RC&D Project area, we are "determined to lift a million acres," as our project slogan indicates, above the depressed conditions that existed here in 1963. And I think we're getting off the ground. We are keeping our commitment alive on the strength of the progress we've made. ♦

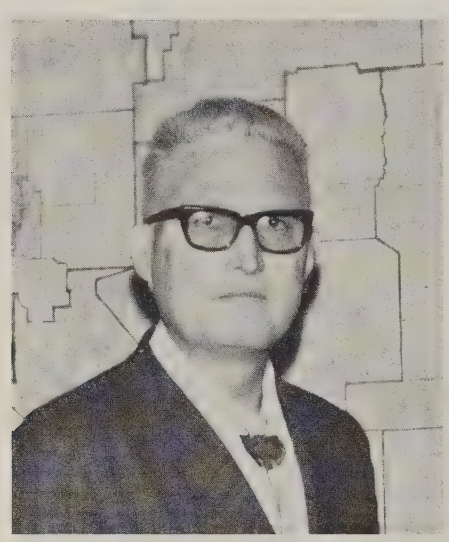




(Left) Harvesting logs is much easier now than in Abraham Lincoln's time, especially with a "knuckle-boom" loader.
(Above) These men are getting information about cutting tree length logs into sawlogs for the greatest economic return. Such demonstrations are sponsored by the Lincoln Hills RC&D Project.

We're catching up in central Nevada

by James M. Kielhack



The author: James M. Kielhack is a rancher in Big Smoky Valley, Nevada. He is chairman of the Steering Committee of the Central Nevada Resource Conservation and Development Project, president of the Nevada Association of Soil Conservation Districts, and chairman of the Nevada State Soil Conservation Committee.

The area: The Central Nevada Resource Conservation and Development Project area — 11,897,276 acres—takes in Esmeralda County and parts of Lander, Eureka, Nye, and Churchill Counties.

The Central Nevada Resource Conservation and Development Project is a natural for rural development. Up to now, rural development has been minimal in this area, but we have accomplished enough to know we are on the right track.

Two important factors have given us a push: Establishment of the Central Nevada Resource Development Authority by the State Legislature and a $20,000 grant from the U.S. Department of Housing and Urban Development. That money, with $5,000 from Nevada's Department of Economic Development and $5,000 from the county governments involved, enabled us to complete phase one of our comprehensive plan—an inventory of what we have to work with.

When I say there has been little rural development in this area, I mean just that. Our project area about equals the size of New Hampshire and Vermont together. The similarity stops there.

Instead of a million residents to pay taxes, our population is 5,100. Add together all the privately owned land and you would have an area about half the size of an average county in the United States.

The only incorporated town is Gabbs, population 874. We have no railroad or airline service. Bus service is sketchy. Most telephone customers are on multiparty lines, the kind typical in other rural areas 50 years ago. Roads, for the most part, are narrow and poorly maintained. Sewer systems are unknown.

Ninety-eight percent of the land here is federally owned and administered by the Forest Service and the Bureau of Land Management. Indian reservation land totals about 4,500 acres. State and county owned land comprises roads, townsites, parks, and the like. Our part of the Toiyabe National Forest is in three north - south mountainous strips. Not enough of the timber is merchantable to be commercially important.

In the mid-1960's we formed a development association and applied to the Economic Development Administration for help. We didn't qualify because statistics are available only on a county basis. People working at the Mercury Test Site in Nye County and those in the rich mining areas in northern Lander and Eureka Counties were getting salaries high enough to raise the income average above the prescribed limit.

The RC&D program gave us our chance. With the Austin, Eureka, Tonopah, and Esmeralda Soil Conservation Districts and commissioners from four counties as sponsors, our application for project help went to Washington, D.C., in June 1967.

Our RC&D project was authorized for planning in 1968. In March 1969, our plan of action got approval. The Soil Conservation Service assigned Albert Neu, a man already familiar with the problems we were up against, to work with us as project coordinator.

At about this time, the RC&D Steering Committee agreed that we could work more effectively if we had legal authority. State Senator Emerson Titlow, who heads our Legislative Committee, and our legal counsel, Marshall A. Bouvier, went to work. The result was the Central Nevada Resource Development Authority which gives us power to borrow money, own land, enter into contracts, conduct surveys, and build and operate works of improvement.

The authority asked the Department of Housing and Urban Development to help out with planning funds. That is how we got the $20,000 for phase one, which was completed by an experienced planner, Raymond M. Smith.

The inventory of our resources included 65,000 acres of government land that have abundant rechargeable water at shallow depth suitable for irrigation. Our aim is to get this land, which is controlled by the Bureau of Land Management, released for use as cropland. In crop use—producing the alfalfa, wheat, and barley for which it is

suited—it will make a healthy impact on our economy.

Recreation is also a big opportunity. This generally means water, which is mostly in limited supply. Nonetheless, there are places we can develop. An example is the Kingston Streamsites development on Kingston Creek. A 14-acre lake built by the State Fish and Game Commission is the central attraction.

And Tonkin Reservoir near Eureka can be doubled in capacity and opened to the public.

The urge of Americans to travel, to poke around in interesting places, also is in our favor. We have scores of historic, scenic, and geologic points of interest, and we are taking steps to get them designated as parks, national monuments, and other tourist attractions.

Changes needed in our use of land, conservation practices needed on crop and range land, safeguards needed in all of our development work to prevent erosion and pollution of our water by sediment—all these are in our plans.

Planning is the key to the success we mean to achieve, and we want planning of the highest order —practical, complete, and in the right sequence.

The soil conservation districts, with SCS providing resource information and technical help, are entities through which this kind of planning must proceed. The U.S. Department of Agriculture must give more emphasis to rural planning, in much the same way as HUD works with cities.

In 10 years or so we'll show you a change you won't believe: 50,000 people, enjoying all of the conveniences and facilities in the most prosperous and enterprising rural communities—plus clean air, spectacular mountains, broad valleys, and, our major asset, open space.

These are our objectives. The momentum we have built up—with soil conservation districts, county governments, and local leaders all teaming up with state and federal forces—will see us through. ♦

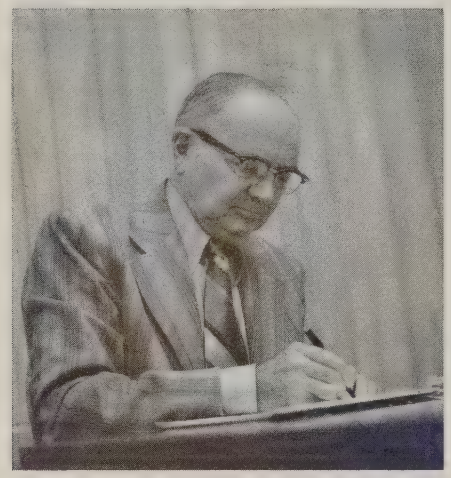




(Top) Austin is typical of the small communities that dot the landscape in the Central Nevada RC&D Project area. (Above) A reliable supply of irrigation water in central Nevada has helped boost the economy. The Toiyabe mountain range is in the background.

RC&D spurs log cabin industry

by Maurice Postley



The author: Maurice Postley is a retired New York newspaperman who has lived in the foothills of the Catskills since 1963. He is an associate director of the Delaware County Soil and Water Conservation District and is in charge of public relations for the South Central New York Resource Conservation and Development Project.

The area: The South Central New York Resource Conservation and Development Project area includes seven counties, but an eighth, Tompkins County, has formally requested inclusion. The original seven —Broome, Chenango, Cortland, Delaware, Madison, Otsego, and Tioga—cover 3.7 million acres. Tompkins County will add 314,000 acres. The area is agricultural in nature; dairy farms predominate. Accessibility from New York City, Long Island, Westchester County, and New Jersey suburbs has increased the popularity of the region for second homes.

A log cabin industry that did not exist a year or so ago is burgeoning in the South Central New York Resource Conservation and Development Project area, and any hard-headed realist would have to agree that developments in recent months offer promise of an industrial complex that may be ideal for the region. And why not? The timber grows locally. The entrepreneurs and workers are local residents. And most of the log cabins are being built right in the seven-county RC&D area.

Urban-oriented people seeking second homes or recreation homes in the country find the log cabin enticing, because it can meet all modern needs and yet retain rural charm.

The idea for the log cabin project originated with Richard F. Howard, a woodland conservationist employed by the Soil Conservation Service. Philip C. Comings, chairman of the RC&D Steering Committee, and his associates gave encouragement.

Among objectives of SOCENY, Howard's alliterative simplification for the South Central New York RC&D Project are the following: Find uses for underutilized natural resources, such as woodland, scenic attractions, and streams; promote activities that can develop job opportunities for local residents; and establish local industries.

Because of a law adopted in the late 1920's authorizing the state of New York to purchase abandoned farms and plant them to trees, the state owns more than 200,000 acres in the SOCENY RC&D Project area. More than 50,000 acres of this state-owned land is in pine trees of 6 inches or greater diameter. An additional million trees are planted each year on about 1,000 acres of privately owned land.

This then was the resource that existed when Howard presented his log cabin plan to the RC&D Steering Committee. "A log cabin industry," Howard stated, "could bring an additional market for evergreen plantation thinnings."

The plantations require regular thinning, and the only use for trees cut in thinning had been pulpwood, a low-value product with an uncertain market.

Both the RC&D Steering Committee and the New York State Department of Environmental Conservation agreed to participate in the log cabin project.

During the winter of 1969-70, Howard drew how-to plans, indicating to manufacturers how machinery could produce pre-cut parts. The RC&D Steering Committee authorized reproduction of plans and made them available to the public at $2.50 per set. About 125 sets have been purchased—from as far away as the upper Amazon Valley of South America.

Inquiries came from loggers, sawmills, building supply contractors and companies, real estate agents and developers, building contractors, and others, including potential sources of financing.

In Howard's how-to-do-it plans, the logs are squared off on three sides. The rounded side is used for the exterior face. The logs are cut to length and numbered to go together like a child's Lincoln log set. A "bead" of asphalt roofing cement applied with a caulking gun closes the exterior crack between any two logs.

Numerous business activities indicate the potential for the project.

In Guilford, N.Y., for example, R. & L. Log Buildings, established in April 1970 by Ralph and Loren Wildenstein, a father-and-son team of dairy farmers with a small sawmill on their property, have had their own crews erect 26 log cabins thus far. And they have orders on hand to keep them busy during the winter.



A worker puts finishing touches on a hunting lodge built from a "log cabin kit."

Log Line, Inc., at Spencer, is headed by Earl Richards of the RC&D Steering Committee. He studied the idea for almost a year and then resigned as project engineer with IBM to go into the log cabin industry.

Log Line has purchased a 35-acre site for a new plant and aims to build 50 log structures in 1972.

The Farmers Home Administration has approved Log Line Buildings for customary home financing. The firm is closely cooperating with New York State College of Forestry, the New York State Department of Environmental Conservation, and the U.S. Forest Service and is working with Cornell University on a plan to help minority groups build inexpensive log houses.

A glance at costs is pertinent. Materials, including floors, walls, roof and roofing, doors and windows, in short, the shell, cost $5 to $8 per square foot. The cost of erection is extra. A small building can be erected at a cost of about $4,000. To this, of course, must be added the cost of land, water, sewage disposal, furnishings, electrical installation, a fireplace, if desired, and so on. At present, the completed buildings range from about $8,000 to $23,000.

About 50 log buildings are now in the project area. At an average of $10,000 each, their cost comes to half a million dollars. In addition to building costs, annual family expenditures to local retail and service businesses are estimated at $50,000 to $100,000 the first year.

It may not be surprising that we are optimistic about the future of this new industry. Those in the log cabin business in our project area believe they will be able to sell buildings outside the area as time goes on and the production process is refined.

The log cabin has not turned back the clock. It has turned it ahead. ♦

New job skills in the Cherokee Hills

by Daniel D. Draper



The author: Daniel D. Draper is the mayor of Colcord, Oklahoma, and the superintendent of schools. He has held the latter position for 18 years. He is past chairman of the Cherokee Hills Resource Conservation and Development Project Executive Committee and current chairman of the Training and Retraining Subcommittee.

The area: The Cherokee Hills Resource Conservation and Development Project area includes Adair, Cherokee, Delaware, Mayes, Ottawa, and Sequoyah Counties in northeast Oklahoma. This area of forested hills, small livestock farms, sparkling streams, and scenic lakes is the terminal point of the historical Trail of Tears, a journey made by the Cherokee Indians in the mid-1800's.

The Cherokee Hills Resource Conservation and Development Project is giving people in our area a chance to upgrade their lives through job training.

In common with much of rural America, low educational levels and unemployment have plagued our area for decades. One problem seemed to fuel the other in a circle of events that led us nowhere.

Added to this was the migration of young people who had completed high school and received advanced academic or technical training. Our most valuable resource, trained youth, was being siphoned off to metropolitan centers. Young people had no real alternatives because opportunities were scarce.

In 1965, the Cherokee Hills RC&D Project was formed through the impetus of conservation districts in Adair, Cherokee, and Delaware Counties. Since that time, the project has been expanded to include Sequoyah, Mayes, and Ottawa Counties.

The project sponsors recognized early that attention to education and unemployment needs was essential. It was useless to expect citizen action on a broad front until people's basic needs for good jobs and self-esteem were met.

Members of the RC&D Subcommittee on Training and Retraining knew the problems all too well. The task was to find solutions.

The Soil Conservation Service and state education and employment agencies alerted us to the vehicle needed to meet training goals: the Manpower Development and Training Act, passed by Congress in 1962. The RC&D concept—local people working together on an area basis to reach specific objectives—was an ideal forum to implement this act.

Funds required to carry out the training program were determined, and a pilot proposal was submitted to Washington. Phase I of the Cherokee Hills RC&D Project proposal was approved early in 1968; $300,000 in federal funds were made available. It was the first time that Manpower Development and Training Act funds were obtained through an RC&D project.

One hundred and fifty-five men and women were enrolled in the initial seven training courses: bulldozer operation, farm machinery maintenance, welding, machine tool operation, stenography, small motor repair, and tractor and implement repair. Class size was limited so that each student could receive individual attention. Classes were held in public schools, colleges, and community centers.

Oklahoma's State Employment Service and Department of Vocational-Technical Education do the legwork in setting up the training courses.

The State Employment Service screens applicants to determine which have the most need for training. Applicants must be unemployed or underemployed and at least 18 years old. Those selected are paid $38 a week, plus mileage, and $5 for each dependent up to a maximum of six.

According to the Employment Service, 75 percent of the graduates find employment. Many make two or three times their normal income as a result of skills acquired through training.

The Department of Vocational-Technical Education hires competent instructors for these training courses and develops course outlines. Technical courses utilize the learn-by-doing principle along with classroom instruction. Counselors keep students advised of their progress.

The Cherokee Indian Tribe, the Bureau of Indian Affairs, Northeastern State College at Tahlequah, Northeastern A&M College at Miami, several local school systems, and other organizations have contributed to the success of the training program by providing supervisors, local sponsorship, training sites, classrooms, equipment, and facilities.

Many young men and women in

the area say the training program pays off in a better way of life.

Robert Hogner, a Cherokee Indian from Tahlequah, is a good example. Married and the father of four children, Hogner is a skilled welder.

"Before I took the welding course," Hogner said, "I was out of work much of the time, and when I was working it was usually as a dishwasher. I make more than twice as much money with this job than I ever did before."

Mrs. Margaret Collins, secretary at the Cherokee County Concerted Services office, is a graduate of the 30-week stenography course. Typical of many young married women, she faced the challenge of financing her husband's way through college with no technical skills or vocational training.

"I didn't have the time or the money to attend business college," Mrs. Collins said. "It was either go to work at a low-paying job or get some short-term training I could afford."

The Cherokee Hills training program is 3 years old now. About 700 people have received vocational training; 280 of these have been Cherokee Indians, and half of the male participants have been military veterans.

Because of this success, the Cherokee Hills Skill Center in Tahlequah was established to serve vocational training needs in the six-county project area.

Operated by the State Department of Vocational-Technical Education, the center in full operation will have a capacity of 90 pupils.

Training will be given in health occupations, clerical skills, mechanics, welding, water and sewage treatment, and heavy equipment operation.

The Oklahoma Employment Service will provide training allowances for the students and help in placing them. The center will be housed in a 24,000 square-foot building owned by the Cherokee Indian Tribe and leased to the center.



The Cherokee Hills RC&D Project has sponsored a training program for 3 years. These students are learning bulldozer operation and maintenance.

The Cherokee Hills RC&D Project's training effort has been demanding, but results have been rewarding.

The main reason for the high degree of success, I believe, has been twofold: conscientious effort of local citizens cooperating together for a common cause and responsiveness of government agency people and legislative leaders.

The 1970 census data give a subtle indication of things to come in the Cherokee Hills. All six counties in the project area showed increased population over the 1960 census, contrary to what's happening to most of rural Oklahoma and rural America.

Our RC&D project has the splendid image, and rightly so, of an action-oriented program that gets things done. It has been the only program I have been associated with above the local level that has been able to reach into the grass roots of our communities and come up with locally initiated, self-help measures. It's a program of the people, there's no doubt about it in my mind. ♦

Staying dry in Berkeley County

by Clyde D. Umphlett



The author: Clyde D. Umphlett is county supervisor of Berkeley County, South Carolina. He is a commissioner of the Berkeley Soil and Water Conservation District and of the Lowcountry Resource Conservation and Development Project and chairman of the county RC&D Committee.

The area: The Lowcountry Resource Conservation and Development Project area covers seven counties in the extreme southern corner of South Carolina. The major resource problem is lack of water management.

Our whole county is low and wet, so I know the need for drainage.

In 1966, our area was growing fast. If in no other way, I could tell by the number of calls from people complaining about something, especially after heavy rains—their lots were under water, septic tank effluent was bubbling out of the ground, they couldn't get across a flooded road.

All I could do was put them off. We had little money, practically no equipment, and no engineers. But we had to do something; we had to find help.

At about this time, we heard about resource conservation and development projects and started action to get one going in Berkeley County and the six surrounding counties.

I visited every community in Berkeley County, telling people about the help that we could get through RC&D. I have never seen people so enthusiastic. Twenty-three communities put in requests for drainage work, and the county applied for a watershed project covering about one-fourth of the land area.

After St. Stephens, our first project, was completed, we thought we were on our way. But additional problems were always popping up. A group of about 20 landowners, known as the Ben Nelson Group, needed help but had no organization to sign a maintenance agreement with the Soil Conservation Service.

They explained their problems to county officials, and the county agreed to enter maintenance agreements for all RC&D, U.S. Army Corps of Engineers, and Public Law 566 work.

Another group, also needing a flood-prevention and drainage program, could not raise 25 percent of construction costs as required by the RC&D project. Again, I went to the county delegation and explained that for every dollar the county spent on this program it would get $4 worth of work. The delegation knew how badly this work was needed and provided the necessary money. Since then all community flood-prevention and drainage projects can receive financial assistance from the county.

The 1970 census reports that Berkeley County is the fastest growing county in South Carolina. This is not hard to believe because now we are getting more calls for help than ever before—not only from individuals, but real estate developers too.

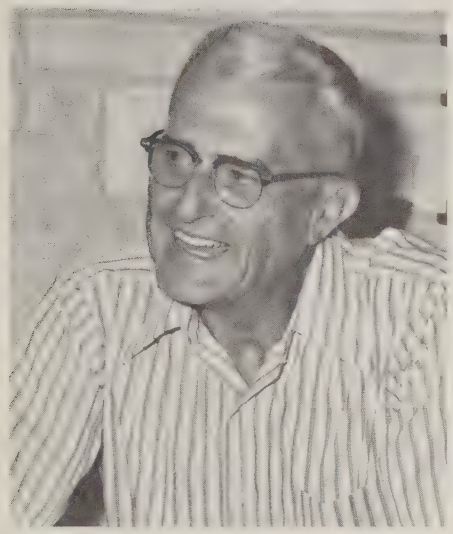
Many people buy low, wet land because of the cheap price. After a heavy rain they realize they were gypped and call me to complain. Lots of people have bought houses when the weather was dry, only to find later that they live in a pond.

The county governing body is doing all it can. In addition to RC&D work, it is clearing the way for drainage under the Rural Environmental Assistance Program and for farm drainage programs surveyed and designed by the Soil Conservation Service. I hope to employ a county engineer soon to get better roads and more drainage.

We live in a low area, and our perennial problem is wet land. We must build and maintain open canals to have a decent place to live. ♦

Prescription for progress

by L. R. Dudney, M.D.



The author: Dr. L. R. Dudney is a retired physician living in Gainesboro, Tennessee. He was a principal organizer of the Hull-York Lakeland Resource Conservation and Development Project and served as its first president. He is still a member of the RC&D Board of Directors.

The area: The Hull-York Lakeland Resource Conservation and Development Project serves an area almost entirely in the Upper Cumberland River watershed of north central Tennessee. The area, about 2,578,-500 acres, embraces Clay, Cumberland, DeKalb, Fentress, Jackson, Macon, Overton, Pickett, Putnam, Smith, and White Counties—all in Appalachia.

I am not a man who likes crowds. I don't like brick. I don't like concrete. I don't like pavement, glass, and chrome. I'm a man who likes to get outdoors and see things as they really are.

Jackson County, where I live, is considered one of the poorest in the nation. I think that it is one of the richest. It is rich in natural things—the beauty of the countryside, the peacefulness of life.

When we were just getting our RC&D project going, we were confronted with problems that were too big for any one person or any one county. In effect, we had to erase county lines and work together as an area. At first, people were a bit unconcerned, but they soon learned what working together can accomplish.

It seems to me that the RC&D area approach to motivating people is the best approach. After all, a group of mountain people is a group of mountain people, and a group of people who live in the desert is a group of people who live in the desert. They live in different environments, face different problems, and need different types of RC&D projects.

The greater part of our project area is in mismanaged forest. What many people do is just plain forest raping. They go in and take what they want, totally disregarding anything else. Now, forest improvement is the goal of the Appalachian Forestry Association, a Hull-York RC&D Project spinoff. Not we, but our children, will reap the benefits of forest improvement. Frankly, such a long-range project would have fallen flat on its face if it had been the first one started in the RC&D project, but people already had experienced success with many short-range projects.

The Upper Cumberland Recreation and Tourist Association also came about because of RC&D. Ward Draper, a local man who evidently can see into the future, gave a lot of time and hard work to this group. With a lot of good farmland being taken by a new lake, Draper could see that our basic industry, agriculture, would have to be replaced. Our beautiful lakes and mountains are ideal for the tourist. And so grain, livestock, and tobacco are out; tourism is in. Our program of land-use management—I don't like to use the word "zoning"—controls the haphazard growth of recreation facilities and vacation homes.

One of our major problems, though, is the disposal of nonbiodegradable solid wastes. It's alarming and almost sickening to think of the nondegradable material that is cast aside, creating eyesores.

If we were to gather up all our solid waste, where could we put it? Someone will say, "throw it away," but there is no "away" anymore. We have no place to put waste material, and that's not only here; that's all over the nation. We must begin to recycle solid waste.

If our RC&D project were disbanded today we would not return to old ways because we have learned to seek help and to communicate and work together.

Often I'm consulted on local problems. If I don't know the solution, I say, "Listen, I think I know where we can go for help." Before the RC&D project, many people did not know how to use our county extension agent, our Soil Conservation Service people, or our fish and game officer. Today they do. The eight libraries that have been completed in the RC&D project area are extensively used by the people.

The main achievement of the RC&D leaders here boils down to one thing: motivating and teaching the people to take what they have and do for themselves what they should have been doing all along. ♦

Review

Books

Principles of Turfgrass Culture. By John H. Madison. *1971. Von Nostrand Reinhold Company, New York. 405 pp. plus index, illus. $19.95.*

This book is one of the most comprehensive references on turfgrass culture that has come to my attention. It is a single source of information, containing much of the current material now available on turfgrass science.

The author covers the anatomy and morphology of the turfgrass plant; taxonomy, cytology, genetics, and physiology; turfgrass climate and microclimate; soils; a brief introduction to soil chemistry and plant nutrition; fertilizers; soil, plant, and water factors in irrigation; irrigation design; drainage and salinity. An instructive feature is the inclusion of sections called practicums which give a "practical review" of most of the major topics in the book.

The only topic I missed in this volume was a dissertation on turf diseases and insects.

There are many illustrations, drawings, tables, charts, and graphs to complement the narrative. These help to give a clearer understanding of the subject matter. Each chapter ends with a long list of references. A glossary, author index, and subject index are additional aids to the reader.

This reference fills a need in the understanding of turfgrass culture. It can be useful to all turfgrass specialists from the researcher to the turf manager.—Joseph W. Turelle, *chief agronomist, Plant Sciences Division, SCS, Washington, D.C.*

New publications

Report on 2,4,5-T. *1971. A Report of the Panel on Herbicides of the President's Science Advisory Committee, Executive Office of the President. 68 pp., illus. $0.40.* Examines in detail the scientific considerations leading to policy judgments about the herbicide, 2,4,5-T. The panel found evidence of measurable benefits from the use of 2,4,5-T, but there was simply very little information that could be used to assess risk. In studies supported by the National Cancer Institute, 2,4,5-T was shown to be teratogenic in both rats and mice; there was no evidence that it was carcinogenic. A review of the environmental effects of 2,4,5-T on nontarget organisms reveals few harmful consequences of its recommended uses. Induced changes in vegetation are followed by alteration in numbers of wild animals. Accelerated erosion of soil may follow the killing of brush with herbicides but mechanical removal causes greater erosion. The panel advised, among its detailed recommendations, that further studies be made and that the importance of the impurities in 2,4,5-T as potential health hazards be ascertained.

The Economics of Clean Air. *1971. Report of the Administrator of the Environmental Protection Agency [202] pp., illus. $1.* Provides estimates of the costs of implementing governmental —federal, state, and local—air pollution control programs and applying air pollution control measures to selected stationary sources (particulate matter, sulfur oxides, carbon monoxide, hydrocarbons, fluorides, and lead) and motor vehicles.

Congress and the Nation's Environment, Environmental Affairs of the 91st Congress. Prepared by the Environmental Policy Division. *1971. Congressional Research Service, Library of Congress. 288 pp. $1.25* An analysis of environmental legislation passed in both sessions of the 91st Congress along with summaries of major reports and highlights of significant events associated with the congressional action. Environmental goals are defined, and federal expenditures for environmental purposes are discussed. An appendix contains a compilation of environmental bills enacted in the 91st Congress, arranged by public law number.

Summaries of Solid Waste Intramural Research and Development Projects. By Andrew W. Breidenbach. *1971. U.S. Environmental Protection Agency. 24 pp.* This report summarizes the approaches and progress associated with solid waste management projects being pursued on an intramural basis. Topics discussed include: occurence and significance of pesticides in solid wastes; toxic and hazardous materials in solid wastes; grinder evaluation and development; use of scrap tires as artificial reefs.

Directory of Information Resources in Agriculture and Biology. *1971. USDA National Agricultural Library. 523 pp. $4.50.* Gives the information resources of the federal government and of land-grant colleges and universities in each of the United States and the District of Columbia. There appears at the back of the directory an organizational index, a bibliographic and collections index, and a subject index of prime research areas.

Highway Impacts on Incomes and Employment in the Ozarks, a Study of Statistical Relationships. By John A. Kuehn and Jerry G. West. *1971. USDA Economic Research Service ERS-488. 27 pp.* Results of this study show that highways were not among the most critical factors in the development of the Ozarks region during the 1950's.

Urbanization of Land in the Northeastern United States. By Henry W. Dill, Jr., and Robert C. Otte. *1971. USDA Economic Research Service ERS-485. 11 pp., illus.* About 85 percent of the rural land urbanized in 96 counties in 12 Northeastern States went to residential use during 1950-60. The remaining 15 percent was used for industrial, commercial, institutional, and recreational purposes, and for airports. Land

in residential use averaged more than 0.5 acre per dwelling. About 50 percent of the land urbanized was cropland. Land going to urban use was largely the better farmland—about 80 percent was in land-use capability classes I to III. For the entire study area, about 0.22 acre of land was converted to urban use for each person added to the population.

Insects and Diseases of Vegetables in the Home Garden. By L. B. Reed and Raymon E. Webb. *1971. USDA Home and Garden Bull. 46. 50 pp., illus. $0.40.* Tells how to recognize the more common insects and diseases that attack vegetables in continental United States and how to prevent the damage they cause.

Help for Environmental Programs. *1971. USDA PA-979. [12] pp.* Lists publications, publishers, and organizations that can help teachers and group leaders with their environmental-conservation education programs.

Commercial Fertilizers, Consumption of Commercial Fertilizers, Primary Plant Nutrients and Micronutrients. *1971. USDA Statistical Bull. 472. 85 pp., illus. $0.75.* Updating and superseding Statistical Bulletin 375, published June 1966, this report presents comprehensive statistics on United States fertilizer consumption from 1850 through 1969.

Direct-Seeding Pines in the South. By Harold J. Derr and William F. Mann, Jr. *1971. USDA Agr. Hbk. 391. 68 pp., illus. $0.65.* Direct seeding of southern pines is a versatile reforestation technique that is being widely accepted by land managers. This handbook discusses site and seedbed preparation, describes direct-seeding techniques, and tells how to protect seed and seedlings from birds, small mammals, large animals, livestock, insects, disease, and weather.

The Look of Our Land, an Airphoto Atlas of the Rural United States: the Mountains and Deserts. Compiled by Simon Baker and Henry W. Dill, Jr. *1971. USDA Agr. Hbk. 409. 68 pp., illus. $1.* Airphotos show characteristics and land use in 32 resource areas in two regions comprising all or part of 11 Western States. Accompanying the photos of each area is a brief description of land use, climate, soils, and topography in that area.

Open-Country Poverty in a Relatively Affluent Area—the East North Central States. By Jeannette Fitz-williams. *1971. USDA Economic Research Service Agr. Econ. Rpt. 208. 55 pp.* Findings of a survey of households in the open country of Ohio, Indiana, Illinois, Michigan, and Wisconsin.

Reproduction of Upland Hardwood Forests in the Central States. By Ivan L. Sander and F. Bryan Clark. *1971. USDA Agr. Hbk. 405. 25 pp., illus. $0.40.* Summarizes data from studies of central hardwood reproduction after harvest cuttings ranging from single-tree selection cutting to complete clearcutting.

Growing Crimson Clover. *Rev. 1971. USDA Leaflet 482. 10 pp., illus.* Outlines where and how to grow crimson clover, the most important winter annual legume for the South.

Soil surveys

Douglas County, Illinois. By D. C. Hallbick and J. B. Fehrenbacher. *1971. 81 pp., illus.; maps 4 inches to the mile (1:15,840).*

Burlington County, New Jersey. By Marco L. Markley. *1971. 120 pp., illus.; maps 4 inches to the mile (1:15,840).*

Milwaukee and Waukesha Counties, Wisconsin. By J. A. Steingraeber and Charles A. Reynolds. *1971. 177 pp., illus.; maps 4 inches to the mile (1:15,840).*

Benton County Area, Washington. By Jack J. Rasmussen. *1971. 72 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Homer-Ninilchik Area, Alaska. By Robert B. Hinton. *1971. 48 pp., illus.; maps 2 inches to the mile (1:31,680).*

Stevens County, Minnesota. By Royce R. Lewis, Donald E. DeMartelaere, and Ernest L. Miller. *1971. 88 pp., illus.; maps 4 inches to the mile (1:15,840).*

Macomb County, Michigan. By Richard L. Larson. *1971. 110 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Alcorn County, Mississippi. By Karl H. Miller. *1971. 54 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Addison County, Vermont. By John E. Griggs. *1971. 119 pp., illus.; maps 4 inches to the mile (1:15,840).*

Meetings

November

8-16 National Grange, Charleston, W.Va.
A topic: Farm Bargaining Power

25-27 National Council for Geographic Education, Atlanta, Ga.

29-Dec. 3 Exposition of Chemical Industries, New York, N.Y.

29-Dec. 4 Western Forestry and Conservation Association, Portland, Oreg.

29-Dec. 5 National League of Cities, Honolulu, Hawaii

December

1-3 National Association of Manufacturers, New York, N.Y.

5-9 American Farm Bureau Federation, Chicago, Ill.

6-7 National Drainage Symposium, American Society of Agricultural Engineers, Chicago, Ill.

6-10 American Association of State Highway Officials, Miami Beach, Fla.

7-9 Symposium on Air Pollution, Las Cruces, N. Mex.

26-31 American Nature Study Society, Philadelphia, Pa.

26-31 American Association for the Advancement of Science, Philadelphia, Pa.

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From the Administrator:

RC&D's are home-grown products

Resource conservation and development projects are not stamped "made in Washington." They are tailored to fit regional needs and to improve the local economic, physical, and social environment. Their local character is part of their strength.

The RC&D idea of areawide pooling of resources and talents, local leadership and decision making, and "starter" funds from the federal government is 7 years old now. The program has grown to encompass 98 projects authorized for planning. These include 624 counties—more than one-fifth of the counties in the country—and more than 372 million acres.

Twenty of the 98 projects recently were approved by the Secretary of Agriculture, in line with the direction of Congressional committees. This approval, the most in any single year, reflects the growing regard for the program by the Administration and the Congress.

RC&D project leaders share with conservation district leaders a concern about soil erosion, sediment, and water runoff on agricultural land. But they also include many social and economic factors in planning the development of a project area. For example, in the Eastern Connecticut RC&D Project area, project leaders and USDA and state agency people have formed an "environmental impact team" to guide local builders and developers. The team is made up of specialists like soil scientists, engineers, and landscape architects.

If there is great diversity of project interests, there is also great unity of purpose on the part of local leaders. This is demonstrated in the firsthand accounts by local RC&D leaders appearing in the November and December 1971 issues of SOIL CONSERVATION.

Whether it is developing forest resources in Indiana or recreation facilities in Arkansas or providing job training in Oklahoma, RC&D projects carry an open-end commitment to "make it work." Their focus is on current needs and priorities.

The spirit that has characterized RC&D's all over the country perhaps is best summarized by a slogan that appears on the masthead of each newsletter published by the Mountain-Dominion RC&D, Princeton, W. Va. It reads: "There is no limit to what can be accomplished if it doesn't matter who gets the credit."

Kenneth E. Grant

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SOIL conservation

December 1971, Vol. 37, No. 5

RC&D—Part II

This month again SOIL CONSERVATION is pleased to feature articles about RC&D projects written by local, non-SCS people—all leaders in their communities. Dr. Daniel Hale tells us about managing water in the Mountain-Dominion RC&D area, Judy Machen about an RC&D project that helped bring a farmers' market to Los Alamos, New Mexico, and Lynn Barnes about flood problems in the Willamette Valley, Oregon.

Also in this issue SOIL CONSERVATION reports about Maryland's urban conservation tours.

COVER: Snowmobiles on the Crow Wing Wilderness Trail near Huntersville, Minnesota, in the WesMin RC&D Project area. The photograph is by Erwin Cole, Lincoln, Nebraska.

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

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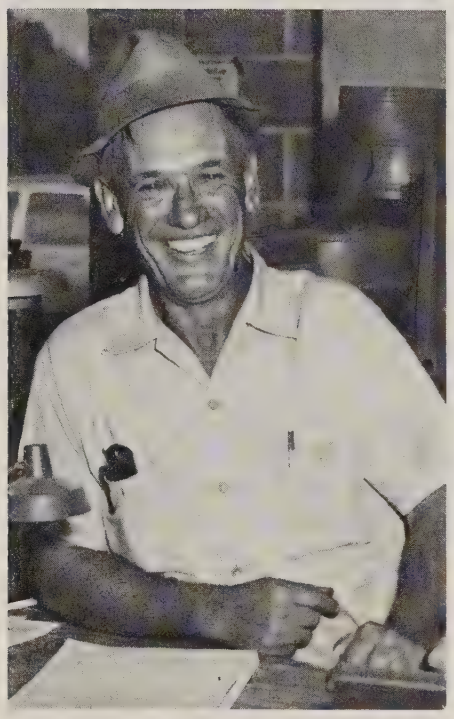
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Industry makes the Wiregrass grow

by Marion Sanders



The author: Marion Sanders is chairman of the Wiregrass Resource Conservation and Development Steering Committee. He is president of the Ariton Peanut Company of Ariton, Alabama, a member of the Coffee County School Board, chairman of the Coffee County Soil and Water Conservation District, and second vice president of the Alabama Association of Soil and Water Conservation Districts. He has more than 500 acres in corn, peanuts, improved pasture, and hay.

The area: The Wiregrass RC&D Project covers an area of 3,952,000 acres in southeast Alabama, which is known as the Wiregrass because of the wiry native grass once plentiful in the area. The project area includes Barbour, Coffee, Covington, Crenshaw, Dale, Geneva, Henry, Houston, and Pike Counties.

Commerce and industry have moved rapidly into the Wiregrass Resource Conservation and Development Project area and have changed the lives of many residents.

When I began farming here 18 years ago, more than 70 percent of the people lived in rural areas. Of these, two-thirds made their living by farming, and the rest worked in town in farm-related businesses.

Farmers were growing 200,000 acres of cotton, 450,000 acres of corn, and 425,000 acres of peanuts.

But agriculture has changed and so has our economy. Mechanization and the cost-price squeeze are largely responsible.

Tenant farmers had to leave and seek work elsewhere. Acreage allotments on our main cash crops hurt too. Today we are nearly out of the cotton business; we planted less than 23,000 acres in the nine-county area in 1971. Corn is down to 250,000 acres; peanuts, down to 170,000 acres.

The time is right for industry to move in. It's a welcome boost to our economy.

Eufaula probably is the community that leads in new and expanded industry in the Wiregrass area. Joel Smith, editor of the *Eufaula Tribune,* attributes this growth to "the attitude of the people and to young, energetic leadership."

Smith puts it this way: "Being located on the Chattahoochee River has helped, but it is the desire of young leaders to see Eufaula grow that is paying off. We had an abundance of undeveloped natural resources. Today recreation is our biggest industry—fishing, skiing, boat races, camping, art shows, antique shows, and ante-bellum home tours."

Jim Bradley, president of the Eufaula Chamber of Commerce, points to 13 new industries as evidence of what can be done when everybody works together.

Dr. Willard Smith, president of the Eufaula Industrial Development Board, sees the Chattahoochee Valley as one of the growing industrial areas of the South. "You must have the natural resource base to build upon, and we are fortunate in having one of the best," he claims. "We have a 45,000-acre lake for recreation and water transportation, a mild climate, a good highway network, and a productive agricultural area. If we can get a permanent, stable channel constructed in the lower reaches of the Chattahoochee River, more industry will come to this area than we are presently prepared for. There is no question about that."

A shining example of a small town going all-out to attract industry, and quite successfully, is Slocomb, in Geneva County.

Mayor Lawrence Harris puts it this way: "We didn't worry too much about attracting industry until we had something to offer. We needed people; with people, we could get industry.

"We concentrated our efforts on sewerage and water supply, adequate housing, and an attractive environment. We needed flood prevention and drainage, too, and the RC&D project helped us get them." He was referring to a 3½-mile channel improvement project completed in 1968 with RC&D funds —a project that brought a lagoon and new housing to a formerly swampy, mosquito-infested area where once the city had dumped its wastes.

Slocomb now has an adequate water supply. Between 1960 and 1970 its population increased from 1,300 to 1,900. A hundred new houses a year are being built. Four new industries came in during the first 6 months of 1971, and a fifth came in in September.

Agriculture-related industries also are locating in the RC&D area. Fresh vegetables are packed in the area and shipped to distant markets. A new poultry-processing plant recently began operations in Coffee County, and two egg-processing plants are to open soon. These will employ about 500 people.

Fort Rucker has made a tremendous impact on our area. Ci-





(Above) The industrial future of the Wiregrass area depends to a large extent on the development of the Chattahoochee River for transportation.
(Left) Peanuts are still a big cash crop in the Wiregrass. A yield of about 3,000 pounds per acre is expected from this field.

vilian employment there averages about 3,000. Many rural people took jobs at Fort Rucker when they could no longer farm.

We've probably seen more growth and development in commerce and industry during the last 5 years than during any similar period since the turn of the century.

Alabama Development Office reports for 1969 and 1970 show 51 new and expanded industries in the Wiregrass area. These provide jobs for about 4,400 people. Capital investment is more than $17 million.

RC&D project coordinator, C. F. Lyle, says that RC&D contributes to community growth and development by getting people to work together toward common goals. And that has been our greatest achievement. Since our RC&D project began operations in 1967, local and county government officials have become more concerned about resource development and are working together effectively to carry out the objectives of the RC&D plan.

The golden years for the Wiregrass area are yet to come. In the future, young people who leave to get an education can come back home to work and live. ♦

Innovation makes it work



by Howard W. Peterson

The authors: Howard W. Peterson is chairman of the WesMin RC&D Project Steering Committee. He was born and lives in Benson, Minn. He is a farm owner, businessman, and educational director in the public relations department of the Farmers Union Grain Terminal Association in St. Paul.

John E. Rife is a director of the WesMin RC&D Project. His public service has earned him a place in "Who's Who in the Upper Midwest." In addition to membership on 10 boards, councils, and commissions, he runs a 660-acre stock farm near Sebeka, an insurance agency, and a garage business. He was recently appointed to the Governor's Natural Resources Advisory Council.

The area: The WesMin Resource Conservation and Development Project was organized in 1964 and originally included Swift, Pope, Kandiyohi, Wadena, and Otter Tail Counties. Douglas, Grant, Stevens, and Todd Counties joined in 1970. The area, in west central Minnesota, had been characterized by abandoned farmsteads, shrinking towns, aging lakes, and unused forests.

A resource conservation and development project is a vehicle for innovators. Without innovators, RC&D projects won't work. The WesMin RC&D Project is working.

One of our hardest working innovators is John Bohmer, a banker in the little town of Brooten. To most people, he is the voice of 320-square-mile Bonanza Valley. A recent writeup in *American Banker* tells of John's leadership in developing the area where irrigation is a bonanza. As John tells it: "Here was a town with no resources except struggling, marginal farms. Only a few years ago, landowners were putting their farms into the soil bank and leaving for jobs in other places. Now they've come back to find the land has doubled in value because of the irrigation potential. In our first year of irrigated potatoes, we harvested 330 bushels per acre."

The water for irrigation has always been there in the ground, but we didn't know it. This ground water comes from rechargeable, shallow aquifers. A million acres are being looked at by the U.S. Geological Survey, and indications are that we have plenty of high-quality water down to the 100-foot level.

Our farmers began irrigating corn because it's a crop they're familiar with. Now they're irrigating potatoes, snap beans, cucumbers, and other crops. It takes time to build up facilities and markets, but already there is a new potato washing and grading plant in Brooten.

Irrigation has brought Brooten back after its long decline. Main Street is now filled with young businessmen. The *Bonanza Valley Voice* is a new newspaper. There is a new apartment building, a new fertilizer plant, an irrigation equipment factory, and a new fire department headquarters. A brand new snowmobile company was organized in April, and half a dozen other businesses are on the verge of coming in.

Recreation is important to the economy throughout WesMin. A third of Minnesota's 10,000 lakes are here, so we've got a natural attraction for tourists and homeowners who want to be near water. On the other hand, pollution is getting to be a big problem. Thus the need for another innovator.

George Tengwall, a Willmar insurance agent, has a home on Eagle Lake. This lake was getting sewage from the houses that surround it. Tengwall, who is a former chairman of the Eagle Lake Improvement Association, and RC&D specialists joined forces to develop a program that would solve the sewage problem. Innovations in their program of action include passage of enabling legislation for rural sewer districts in the state; construction of a sewerline around a rural lake; and design of nutrient filtering dams to be built in the watershed.

Eagle Lake is just one of many lakes that need this kind of treatment. The Minnesota Department of Natural Resources estimates that 3 percent of Minnesota's lakes will have to be cleaned up in the next 15 years—about 90 of them in the WesMin area. Costs will run into millions of dollars. George Tengwall and the Eagle Lake project show how this work can be done through local leadership and cooperation.

North and west of Willmar, the winding Glacial Ridge Scenic Trail is another example of innovation—putting a new face on an old resource. In 1967, Carl Prosek began laying out the trail on existing roads. The RC&D Committee, through the leadership of vice chairman Clint Haroldson and the Glacial Ridge Development Association, has expanded the trail to 150 miles. Today, it's possible to see deer, partridge, ducks, skunks, and a host of other wildlife in one outing. One can drive through deep woods and open meadows, following prominent

arrowhead markers, and find more than 30 lakes with excellent fishing, three state parks, hundreds of duck ponds and marshes, numerous private parks and camping areas, several riding stables, scenery second to none, and more than 100 of the best resorts and accommodations in Minnesota.

Next to recreation and irrigation, I would say housing is a program in which we've made some big strides. We still have a long way to go—43 percent of our housing is considered substandard. Park View Manor in Benson, with 70 apartments for senior citizens, was an early RC&D project accomplishment. Since then, eight more housing projects have been completed or are under construction, making a total of 611 housing units.

All of us in RC&D are interested also in keeping young people in the area. We've been watching them go away, and we wind up with old leadership. But we have some young innovators now.

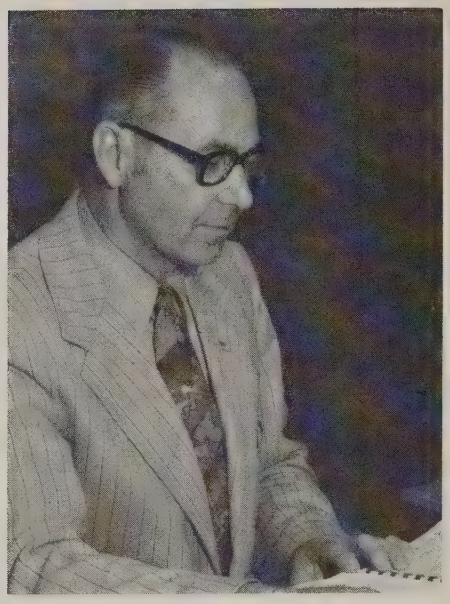
RC&D has approved the first two cooperative grazing associations in Minnesota. This was the work of two young University of Minnesota graduates. The associations cover 2,600 acres west of Benson, and each landowner puts in 125 beef cows. The grazing ratio of 2.6 acres per cow-calf unit is far better than that in the West.

I have a special interest, I guess, in agriculture. In 1869, my granddad led an old brindle cow out of Minneapolis and established the family homestead in Benson. We have been here ever since.

An important new interest is pollution control. At a meeting on solid wastes in the Governor's office, we learned we've got to begin thinking of wastes as a resource—quit using things once and then throwing them away. We're going to have to recycle wastes so they won't be a liability. This, too, is resource conservation and development, and we have the solid backing of the state's pollution control agency.

WesMin is big and things move slowly. There are a lot of disappointments, but bright spots, too. Many people have benefited from our efforts, and we've had fantastic success in getting legislators to see the need for funding—I think, because we come in well prepared with documentation.

What needs to be done for rural development and for the environment is well identified in our RC&D project. What we need are more innovators. ♦



by John E. Rife

In the WesMin RC&D Project there is a north and a south, each with a different economy. Average income is $1,500 to $2,000 lower in the north than the south. Families in the poverty class are 25 to 30 percent more numerous up north. Farms are not marginal, they're submarginal. In the north, we have to do with what we have—poor farms, low-value wood, and good people.

Recreation is important to our economy. Because we thought so, we put together the Crow Wing Canoe Trail, helped create the Huntersville impoundments, and improved our park system. It's hard to evaluate the results in dollars and cents.

The hard core of our problem is jobs for people. We create jobs through recreation, but the work is seasonal. We need full-time employment for our people. RC&D is people—understanding their needs and wants, communicating, and working together. We're successful



Low rent for the elderly was an early measure of the WesMin RC&D Project. This apartment building is in Benson, Minn.

in this respect but not so successful as we could be in working with bureaucracy.

Government bureaus think more of metropolitan areas, it seems, not realizing that neglecting us only makes problems worse in the cities. If we could improve the quality of life out here, we could stop the brain drain and the outmigration of rural people.

But we haven't given up. We're doing things here that economists said couldn't be done. We put the first RC&D facility in the United States into operation—the Crow Wing Canoe Trail. We expanded it to include snowmobile and saddle trails. We developed three new parks—Menahga, Sebeka, and Sunnybrook at Wadena.

Resorts, lakes, swimming, boating, and skiing, of course, have been here for years, but we've built upon them. More than 50,000 people used our canoeing facilities last year. The annual trail rides bring in 600 to 700 horseback riders. At the annual snowmobile ride, 400 to 500 riders turn out.

The idea for the Crow Wing Trail came from the inspiration I got attending the Duluth Land and People Conference in September 1963. The Crow Wing River looked to me like the place to start.

In developing the Crow Wing Trail, we first contacted the county game manager to find out exactly where tax-forfeited land lay along the Crow Wing River. The Wadena Soil and Water Conservation District Board then looked the areas over and asked the county commissioner to set aside the land picked for campsites. Where no county land was available, we approached the landowners.

Next, we asked rod and gun clubs in the towns along the river for help in developing the campsites. They were enthusiastic and cooperative, as were the hundreds of people who helped with the canoe trail in one way or another.

The next step was promotion. Chambers of commerce helped finance a brochure. And local papers, Jim Kimball's articles in the *Minneapolis Tribune,* and ads in national magazines gave us wide publicity.



The Crow Wing Canoe Trail has brought recreation and jobs to the people of west central Minnesota.

One thing we didn't anticipate was wear and tear at the campsites. Overuse has caused erosion, so erosion control is one of our newest projects. Shaping, stairways, and thorny living fences around eroded areas help solve this problem.

We began with summer recreation and expanded it to a year-round activity. Now we need to go to something else, keeping in mind our goal of jobs for people. Industry is our biggest need.

The Minnesota Forest Products Cooperative at Menahga has received a loan and is expanding its sawmill to provide a 6¼ million board feet market for saw timber. But this isn't enough. Our forest resource is not being used to its fullest potential. Aspen, particularly, is still largely unused or wasted.

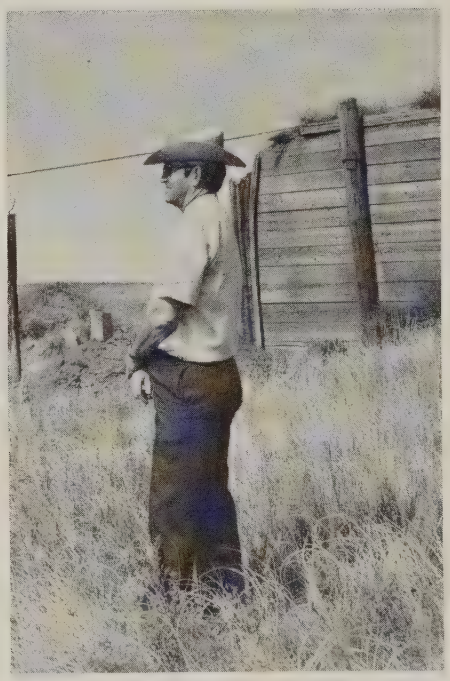
With local capital we have formed the Minnesota National Pulp and Paper Corporation to bring in a $52 million pulp mill. At this point, we have spent more than $400,000 on feasibility studies by Allis-Chalmers and Mid-America out of Chicago and Rust Engineering of Pittsburgh, Pa. Appraisals have been favorable.

This mill will recycle newsprint from the metropolitan area as part of its fiber. It is designed to meet the standards for control of both water and air pollution.

We're proud of our low-cost housing in Sebeka and Wadena.

I could mention several other accomplishments. But, to sum up, RC&D can be of tremendous value in rural America if we can just get the tools to do the job. ♦

Miles and miles of sunflowers and RC&D



by Glenn Shriver

The authors: Glenn Shriver is chairman of the Sunflower Resource Conservation and Development Project Steering Committee. He was raised in Barber County, was county extension agent in Edwards and Rice Counties for several years, and is now a banker at Coats in Pratt County.

Edgar Barrett was the first chairman of the Sunflower RC&D Project Steering Committee and is now vice chairman. He is a farmer-stockman at Anthony in Harper County and a past chairman of the Harper County Soil Conservation District Board of Supervisors.

The area: The Sunflower RC&D Project area covers 3,994,700 acres in south central Kansas, south and west of Wichita. It includes the counties of Barber, Comanche, Harper, Kingman, Kiowa, Pratt, and Sumner. Population in the project area has declined 13 percent since 1940. The present population is 69,000.

The Sunflower RC&D Project area is more than 100 miles long and about 60 miles wide and includes both cropland and rangeland.

Six months after our project got underway we had about 250 project proposals. One that we're working on is range improvement. About 600,000 acres of our rangeland need rather drastic improvement measures.

A project that we're very proud of is the MacAdoo road fill dam in Barber County. The dam has been needed for 40 years. It is for flood control and will benefit people downstream, but it will also help reduce the county's bridge repair bills. The road fill dam will replace a 60-foot bridge. The sediment pool will hold about 30 acres of water.

We have had a commercial channel catfish committee for some time in the northern tier of this area. We have a tremendous catfish potential there and hope through this committee to develop not only production but marketing processes also.

We also have the potential of growing alfalfa hay profitably both under irrigation and on dry land. But we need to develop markets and harvesting programs.

We are seeing the advent of commercial feedlots here, and these need alfalfa hay. The cost of moving roughage very far is high, so it's profitable for those who live close to the feedlots to market their hay there.

The Pratt Feedlot has about a 36,000-head capacity. A feedlot this size can use much of the grain sorghum production in two or three counties.

I have worked with farm people most of my life, as an extension agent and banker. I have seen many successes, many failures, and I think that the RC&D way of doing things leads to success. The fact that the Sunflower RC&D sponsors —the county commissioners and soil conservation district board of supervisors in each of the counties—are legal entities of government help us get things accomplished. ♦



by Edgar Barrett

The Sunflower Resource Conservation and Development Project area is primarily rural. Rural communities, losing population and facing other problems too, are our basic concern.

With a decline in wheat prices and a rise in costs, the livestock industry is gaining in importance, especially in our part of Kansas. So to serve the 39 percent of the project area that is rangeland, we have a full-time SCS range specialist. Some counties have organized a grazing committee that is promoting such measures as cross-fencing, rotation deferred grazing, and brush control by aerial spraying. We have had rather remarkable results from rotation deferred grazing, even in this dry year.

We have work going forward on irrigation development, especially in the project area's northern tier where there is an abundance of substrata water. Irrigation possibilities in the north are still very considerable.

Insofar as RC&D aims to treat a project area as a total unit, we have organized two regional planning commissions that will include local government officials and others as members. These commissions —the Indian Hills Commission covering the western four counties of the RC&D area and the Chikaskia Commission covering the eastern three counties—are concerned with some of the problems that need areawide planning and cooperation, like transportation, education, and solid-waste disposal, and should be able to take advantage of existing federal programs.

Recreation is an important item on our RC&D agenda. We believe some of the most scenic parts of Kansas are here in the Gypsum Hills region of Barber and Comanche Counties. Some trails and scenic drives are planned, and an old mill near Caldwell will be restored to operating condition.

One of our beautification projects is getting rid of junked cars. Several of the project towns joined together to bring in a portable crushing unit. The nonmetal parts are burned, and the rest of the car is crushed and shipped out.

In the way of education, we are trying for some vocational technical education programs. In this regard, the cooperation between local Pratt Junior College and Kansas State University under Title I of the Education Act is significant.

Housing is another problem area. We have a number of projects underway for low-rental units and housing for the elderly. A producer of prefabricated houses in Harper is expanding his operation. His houses are approved by the Farmers Home Administration and the Federal Housing Administration and can be set up in about 30 days.

Since agriculture is the mainstay of our area, we are very interested in speeding up conservation treatment of cropland. An additional soil scientist has been assigned to our area, and we hope to have a published soil survey of Harper County soon. We have also requested more SCS technical help to speed up conservation treatment of our agricultural land.

I have been associated with our RC&D project since its inception, and I'm proud of what we have accomplished. I'm quite optimistic about the future. I feel we are limited only by our imagination. ♦

To market, to market . . .

by Judy Machen



The author: Judy Machen (shown at left with her husband and children) was born in California and is a graduate of the University of California with a major in sociology. Four years ago she moved to Los Alamos with her husband, a scientist with the Atomic Energy Commission. Mrs. Machen represents Los Alamos County on the Council of the Northern Rio Grande Resource Conservation and Development Project. She is very active in the League of Women Voters.

The area: The Northern Rio Grande RC&D Project covers 4½ million acres in a multicounty area in north central New Mexico. It was approved for operations in October 1964.

The town of Los Alamos, New Mexico, spread out at 7,300 feet above the mesas of the ancient Pajarito Plateau at the base of Pajarito Mountain, commands a vast and beautiful view of the historic Rio Grande Valley and the Sangre de Cristo Mountain Range beyond.

From the pinon- and pine-studded townsite or from the aspen-cloaked mountain slopes directly behind, the townspeople can see as far north as Taos—famous for its ancient Indian pueblo, its Spanish-American heritage, its arts colony, and its spectacular skiing—and as far south as the Sandia Mountains, which crest over the modern metropolis of Albuquerque.

In between lies the capital city of three cultures, Santa Fe. And dotting the landscape are eight Indian pueblos and many small agricultural towns and villages that date back to the Spanish exploration of the Southwest.

Although it looks out over the world, Los Alamos was known until fairly recently as the Secret City, its function and inhabitants, most of whom originally came to help build the atom bomb, unknown to the people of northern New Mexico. Communication has grown and improved since Los Alamos became an open town, but in some ways it remains isolated from its neighbors in the Valley.

Something as simple as buying fresh fruits and vegetables had long been a problem to housewives in Los Alamos. Produce shipped to the town mostly comes from out-of-state and often sits for days in warehouses.

Although the women made trips to buy the outstanding native chili and apples at roadside stands, barriers of language, distance, and isolation prevented them from obtaining farm produce regularly. At the same time, the plight of the Valley farmers, whose economy is marginal, was apparent.

It was a member of the Los Alamos League of Women Voters, Jessie Rudnick, who came up with an idea for solving both problems —start a weekly farmers' market in Los Alamos.

This was easier said than done. How would farmers learn about and be encouraged to grow produce for the market? Who would run the market and be responsible for the legal details? Who would publicize the market to the townspeople and urge them to support it?

The Northern Rio Grande RC&D Project Council supplied the answers. The League of Women Voters is a member of the council, and it was to the council that Mrs. Rudnick went with her idea. And so, Project Measure 245 was born.

Throughout the winter and the following spring the RC&D project coordinator, Phil Lovato, and other SCS people, Extension Service people, county officials of Los Alamos, and the League met to plan the details of the market.

The County of Los Alamos, also a member of the council, supplied the site and signs for the market and took responsibility for health and safety controls. Gene Pollard, assistant to the county administrator, gave his enthusiastic support.

The League of Women Voters agreed to do the publicity and act as liaison between the groups. Palemon Martinez, Extension Service agent assigned to the RC&D council, organized farmers' meetings. And Bernabe Herrera, an SCS conservationist, gave a great deal of individual help and encouragement to Valley people.

In July 1970, the market opened; it was a success from the beginning. Not only are townspeople pleased to buy freshly picked fruits and vegetables regularly and the participating farmers happy with their sales, but also a step has been taken in lessening the isolation and establishing friendships between Los Alamos and others in the Rio Grande Valley.

The Los Alamos Farmers' Market was such a happy success that the League of Women Voters was encouraged to help start a market in Santa Fe. The problems there were quite different, but again, with help from the RC&D people, a local legal sponsor, Concerned Action Inc., was found. As a result of cooperation between SCS, the County Extension Service, the County Board of Health, the City Council, the City-County Planning Commission, and the Organization de Barrios, the Santa Fe Market opened last summer.

Now it is hoped to establish a market in Taos so that northern New Mexico farmers can sell their produce all summer long and into the fall.

One RC&D measure seems to lead to another. Northern New Mexico is dotted with small agricultural villages whose people, during the long winter months, spend much of their time making handcrafted items, some whose origin goes back to Spanish colonial days.

But again, these economically marginal people have few outlets for their goods. Some of the people who worked in bringing about the Los Alamos Farmers' Market suggested that a crafts market be set up to introduce townspeople to the native arts and at the same time aid craftsmen.

And so, once again the Northern Rio Grande RC&D Council was asked for help—this time by the Los Alamos Arts Council, which had agreed to sponsor a crafts fair. For this, the RC&D Council helped locate craftsmen and potential craftsmen.

On September 11, 1971, the Los Alamos Crafts Fair brought together large crowds of customers and 173 craftsmen representing 35 communities and four Indian pueblos in the northern New Mexico area. The event was such an outstanding success that another crafts fair was planned for November, and the Los Alamos Arts Council plans to make such a fair a semiannual event.

Both the Farmers' Market and the Crafts Fair clearly demonstrate to us how RC&D assistance and coordination can bring together such diverse elements as urban, scientifically oriented people and rural, agriculturally oriented people for mutual benefit. ♦

Little Muddy — no more a menace

by Lynn Barnes



The author: Lynn Barnes is a seed producer in the Willamette Valley, south of Portland, Oregon. He is chairman of the Little Muddy Water Control District, which sponsors the Little Muddy Watershed Project in the Upper Willamette Resource Conservation and Development Project.

The area: The Upper Willamette RC&D Project area in west central Oregon, includes Linn, Lane, Benton, and Lincoln Counties and part of Douglas County. The area—5,509,440 acres—is predominantly forest land. Privately owned land mostly in the valleys and foothills totals 2,762,229 acres.

The broad, flat valley of the Willamette River in western Oregon has been my home since I was a boy. My neighbors and I make our living mostly by raising grass and legume seed—ryegrass, bluegrass, orchardgrass, and white clover, to mention a few. Ryegrass is the principal grass seed crop because much of our land is poorly drained and wet for days, especially after flooding. We raise sheep, too, because sheep fit in with the production of grass seed.

Little Muddy Creek flows through our area, and every year, for as long as I can remember, it flooded not once but two, three, four, or more times. The floodwater washed away fertilizer and cut down on our seed yields. It deposited weed seed on our land and reduced the quality of the seed we grew. Many times it drowned out a newly established stand of grass. And it made our pastures unusable for days.

The flooding damaged farm fencing and roads. On Powerline Road, one of our main routes, traffic would be stopped until the water went down. School buses, mail trucks—everything and everyone had to go around the floodwater.

Our efforts to control flooding along Little Muddy Creek, which wasn't little then—it was a mile wide in some places—brought us into the Upper Willamette Resource Conservation and Development Project.

There are 142 farms in the Little Muddy watershed, and most of the farmers are interested in our RC&D project. Not all the farms get flooded, but most have excess water.

When the Upper Willamette RC&D Project was announced, we realized we had a chance to get something done. Most of us along the Little Muddy had long been cooperators with the Linn Lane Soil and Water Conservation District, a sponsor of the RC&D project. The Soil Conservation Service, already familiar with our problems, had developed a Little Muddy Creek watershed work plan. Because of the project size and cost—about $600,000—it was decided to spread out



(Above) Every fall, winter, and spring, before flood-control work got underway, floodwater from Little Muddy Creek swept across fields and roads, damaging crops and interrupting travel for days.
(Right) This stretch of Little Muddy Creek has been reshaped and stabilized with seed-containing mulch.





the work over a 4-year period.

Our application for assistance with this watershed work was accepted by the RC&D sponsors early in 1964. Our next step was to form a water control district because we needed a legal instrument to carry our plans forward. O. E. Mikesell, head of the Linn County Extension Service, was a great help to us.

Owners of more than half the acreage in the Little Muddy Creek watershed signed petitions favoring a water control district. The Linn County Commissioners, after hearing all the opposition, declared the Little Muddy Creek Water Control District formed.

Mrs. Lucille Foster, who owned 93 acres adjoining my land, was one of the opponents at this time. The acreage she owned was part of a farm her grandfather, John Cogswell, homesteaded in 1872. Mrs. Foster was active in several conservation organizations including the Nature Conservancy. She and the Currin Millers, who owned adjoining land, felt deeply about disturbing the natural values along the stream.

Dr. Stanton Cook, a professor at the University of Oregon in Eugene and head of the Nature Conservancy chapter in Oregon, was interested in the Foster tract because it is relatively undisturbed and considered an ideal place for studying the plants and animals of this area. Mrs. Foster in time deeded the acreage to the Nature Conservancy.

Though the Water Control District law allowed us to condemn property to get necessary easements, we moved slowly, hoping we could work out solutions through conference. Time after time we met with those few who questioned the need for the plan as we had developed it.

I can't say enough about the cooperation we got during these months. Jim Cuykendall, SCS project engineer, and Frank Gurgurich, SCS district conservationist at Harrisburg, were always ready to help the Water Control District Board, as were other SCS people from the agency's state office in Portland. And the board members, Stan Davidson, Dean Gustafason, Dave Malpass, Merle Cook, Orie Kropf, Ben Christensen, Floyd Kropf, George Lynch, and our attorney, John Bock, worked hardest of all. I sometimes called meetings on an hour's notice and at an inconvenient time. Still, I don't recall ever having a meeting of the board attended by less than seven members. We paid innumerable visits to the creek with opponents to the plan, seeking friendly ways to settle differences.

SCS engineers came up with several ways of doing the job. We settled on one that called for the improvement of only 75 feet of the channel running through the Nature Conservancy tract and for the construction of a low 2-foot dike on their northern boundary.

The Nature Conservancy assumed responsibility for maintaining its part of the channel and dike following completion of the work. In this way, the conservation group could control any disturbance in that area. Fortunately, nearly all of this stretch of channel was large enough to handle the volume of floodwater most of the time.

The contract for the first phase of the project went to a road contractor, Roy Norquist of Sweet Home. We couldn't have asked for greater care in the job that Norquist did.

The right-of-way reached 20 feet back from the stream on either side. Trees that offered esthetic value were marked and left untouched wherever possible. Shaped streambanks were seeded and mulched immediately after completion.

Spoil from the work went into oxbows no longer used by the stream. These areas were leveled and seeded to ryegrass and fescues.

We had to call on power companies, the gas company, the State Highway Department, the Pacific Bell Telephone Company, and the Southern Pacific Railroad to move power and pipe lines and give us the necessary easements. Linn County built two bridges and awarded contracts for the construction work.

Last winter and early in spring when heavy rains fell, the work done on Little Muddy got a thorough test. Water in the creek stayed within the banks where the channel has been improved.

The improved channel curves gracefully through the countryside. There are fish in the creek—bass, perch, catfish, and carp.

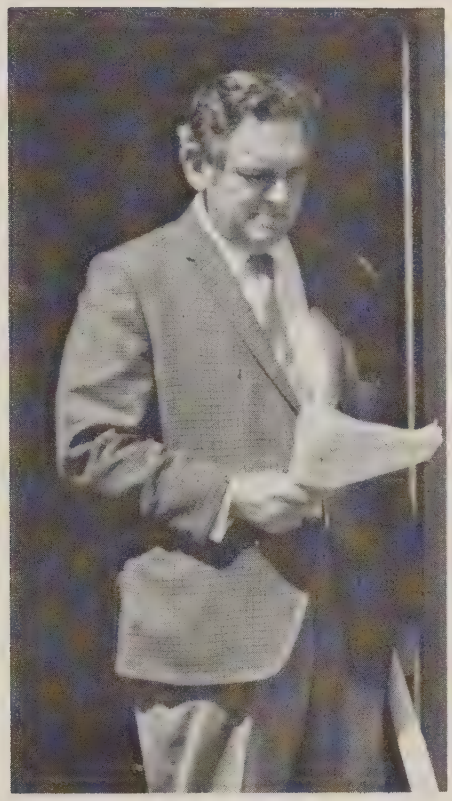
When the work is completed in another year, any of us can begin to grow higher return crops if markets are available. These would include clover, beans, and small grains—crops we could not consider before because of soil wetness.

Since the flooding was controlled, I have tiled 15 acres as an experiment in improving drainage. That area, now safely fenced, is perfect for a lambing pasture for my ewes. The animal waste stays on the pasture and is absorbed for the organic contribution it will make. Water flowing into Little Muddy from the drainage system is crystal clear and free of contamination.

Economists say our total saving in flood damages will be about $55,000 a year. My guess is that, when you consider all the improvements, it will amount to much more. The good part is we accomplished our task with patience, communication, and understanding. Its a process we heartily recommend. ♦

Not just another slum-clearance project

by John Blair



The author: John Blair is a businessman and the mayor of Kountze, Texas, which has a population of 3,500.

The area: The Southeast Texas Resource Conservation and Development Project covers a 10-county area of 5½ million acres. The area is mostly low lying and forested.

For 16 years, Litmon Gay and his family lived in an old two-room house at the north edge of Kountze, Texas. Rent was cheap—about $3 per month.

There was no water, no bathroom, and no real hope for ever living in a better house.

But because people care in our Southeast Texas Resource Conservation and Development Project area, things have changed for Litmon Gay. Today, the Gay family lives in a modern three-bedroom brick house, built on the same lot where the old house had been. The new house has central heat, water, closet space, utility room, and garage. And flowers grow in the neat, well-kept yard.

What's remarkable about this switch, especially to Litmon Gay, is that he *owns* his new brick house. And 21 other low-income families in our city made the transition from renters to owners this year.

Improving housing opportunities in Kountze has been a long, uphill struggle.

During the formative stages of the Southeast Texas RC&D Project, Don Roberts, our SCS district conservationist, and I discussed doing something about the slum area at the north edge of Kountze. A proposal to clear out the slum became a project measure in our RC&D work plan.

From the beginning, I believed that low-income people should *own* their houses. We didn't like the low-rent housing projects we had visited. People there had no sense of accomplishment—pride of home ownership was missing. We had to find a way to replace slums with something better than "nice houses." I wanted modern houses, owned by the people who lived in them.

Troy Berry, our RC&D project coordinator, enlisted the help of the project directors. And the Lower Neches Soil and Water Conservation District, city and county officials, local businessmen, and many others offered to help, so we went to work.

There was a possibility that low-income families could get home ownership loans through the Farmers Home Administration under a program in which interest is based on income and number of dependents.

It wasn't that simple though. FHA couldn't tear down the old houses and build new ones on the same land. We did, however, get a tentative commitment from FHA for making loans on a mass production basis.

Then, as mayor, I went to the city council for a commitment to acquire the land, if necessary, to get the project underway.

When we went to the people in the slum area to sell them on the idea, we found that surprisingly hard to do. People would say: "Why, you can't do that. It won't work. There's too much red tape."

Many times it looked like our project would fall flat on its face. We had plenty of reason to quit half a dozen times. But the enthusiasm and dedication of Don Roberts and Troy Berry kept us from giving up.

Our project really got moving when the landowner, Willie B. Cariker, volunteered to sell the lots at a reasonable price.

First, our city council met with the Hardin County Commissioners and worked out a plan to provide streets and utilities for the area. This probably broke the ice for much future cooperation.

Next, we asked lumber mill owners, who employ most of our low-income people, to help us make a detailed survey, including income and number of dependents, of people who might qualify for low-income housing loans. We enlisted businessmen in Kountze to help applicants fill out FHA forms, reducing the FHA workload and speeding up loan approval.

Last year, we bulldozed some of the shacks out of the way and began construction on seven new houses. More applications poured in. The latest score: seven houses built and three under construction in the slum area; 12 houses built in other parts





(Top, left) Litmon Gay and his family lived in this house for 16 years.
(Bottom, left) Mr. and Mrs. Gay stand in front of their new house built on the same lot where their old house had been.

of town; and 40 qualified families waiting. That's progress for a town our size.

Why have we worked so hard on this project? I can tell you why I got into it. I'm a businessman and a strong believer in every tub standing on its own bottom. Most people's problems are ones they created themselves. But a lot of our low-income people have not been so fortunate as others. Everytime I see someone on welfare or charity, I think that but for the grace of God there go I.

The best way is to help a man help himself. That's why I'm helping our low-income people to own their houses.

Litmon Gay and his family were the first to move into one of the new houses—in March 1971. Already I can see vast benefits to the individuals and the city—increased income from that land to help pay back what our city and county spent on streets and utilities; a vastly improved mental outlook among the people who live in what was once a slum; and children with a better outlook on life. In the long run, perhaps the biggest payoff will be a generation of people who know they have a chance in life. That's our solution to the low-income problem, and that's why I'm pleased to have a home-ownership project, and not a low-rent project, in Kountze.

We've still got a long way to go before we get our old slum looking like we want it to. A hundred lots are marked off, pegged for individual ownership.

We're helping people help themselves in a meaningful, worthwhile way. That's what RC&D is all about. ♦

Managing water in the Mountain-Dominion

by Daniel Hale, M.D.

The Mountain-Dominion Resource Conservation and Development Project was created to help people in the project area manage one of their most precious resources—water. Water keeps the wheels of the project running; water has determined the direction the project has taken.

In attempting to manage this resource, residents in this five-county area have become deeply committed.



The author: Dr. Daniel Hale is a physician in Princeton, West Virginia. He led in establishing the Mountain-Dominion Resource Conservation and Development Project and has been cochairman of its Steering Committee since the project got started. Dr. Hale is a supervisor of Southern (W.Va.) Soil Conservation District and a member of the State Soil Conservation Committee. In 1970, Dr. Hale was named National Watershed-Man-of-the-Year for his leadership in the Brush Creek watershed in Mercer County, West Virginia.

The area: The Mountain-Dominion Resource Conservation and Development Project encompasses five counties: Mercer and Summers Counties in West Virginia and Tazewell, Bland, and Giles Counties in Virginia.

This commitment began in 1956 with the Dave's Fork-Christian's Fork Small Watershed Project. A subsequent and larger Public Law 566 project on Brush Creek, of which Dave's Fork and Christian's Fork are tributaries, brought success and prompted residents to concentrate on the next larger watershed in the area—that of the Bluestone River. This watershed extends across state lines and covers the greater part of three counties in Virginia and West Virginia.

RC&D was to include planning and development of all resources in the five-county Mountain-Dominion area. These counties form a long-established trade area and are bound together by historical, cultural, geographic, and economic ties—a truly "functional rural community."

Water management has been emphasized in the project area because of a deep conviction that water determines the quality of environment in rural communities, is essential to economic growth and development, and is the basis for improving both individual and environmental health. In the Brush Creek watershed a tie-in of health and conservation has already proved advantageous.

The Mountain-Dominion RC&D Project is like an iceberg. Only a small part of its accomplishments and influence is readily visible. The visible part consists of flood-prevention and water-supply impoundment for people in Nimitz and Jumping Branch and a flood-prevention dike around a manufacturing plant at Pence Springs. Both structures are in Summers County. They are examples of rural development in communities where citizens are making "boot strap" efforts to improve their economy and their living conditions.

Some of the less visible accomplishments include:

Finding the only feasible and available site in the Brush Creek watershed for a much-needed reservoir for Bluefield's 20,000 residents. Plans are underway for construction of a multiple-purpose reservoir there.

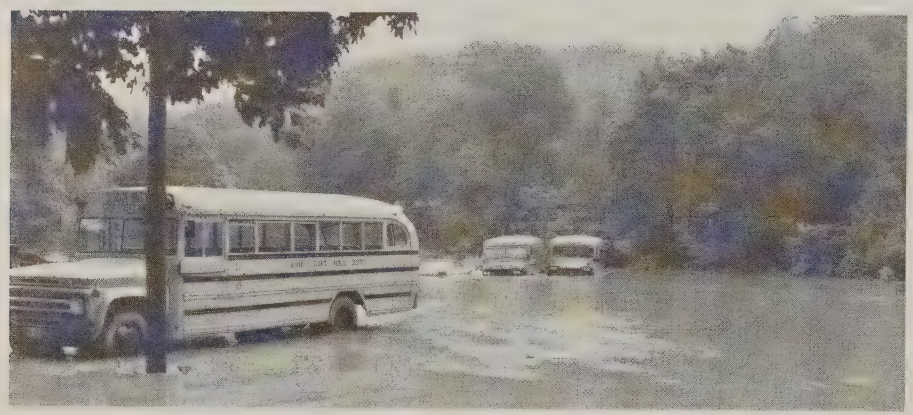
Amassing information for planning a reservoir and water system for rapidly growing Athens, W.Va.

Making available information that helped two communities, Kelley's Tank and Lashmeet, obtain adequate water supplies.

Helping revegetate an area above a new water impoundment at Bramwell, W.Va.—an area with such an alarming rate of sedimentation that the reservoir was expected to lose its storage capacity in only 3 years.

A spectacular achievement of the Mountain-Dominion RC&D Project has been the assistance given to the Southern West Virginia Regional Health Council in establishing three demonstration sanitary landfills in southern West Virginia. About 100 tons of solid waste are delivered to the Mercer County landfill every day. The landfill has been in operation only about 4 months, and already there is a noticeable decrease in roadside dumping.





(Top) The Mountain-Dominion RC&D Project helped to build a dike to protect this plant in Pence Springs, W.Va., from flooding; (Above) it is helping to get a flood-control project to stop flash flooding of Hunting Camp Creek in Bland County, Va.; and (Below) it has helped the West Virginia community of Kelley's Tank replace a spring with a safe water supply.



RC&D personnel are helping with the design and construction of sediment ponds and treatment lagoons to purify polluted drainage from the landfill before it can get into Brush Creek.

To help cope with the mounting volume of wastes at the Bland Correctional Farm in Virginia, a sanitary engineer, a civil engineer, and environmental specialists from the Southern West Virginia Regional Health Council were made available by the RC&D project. This effort was so successful that it has led to reevaluation of solid-waste disposal at all state institutions in Virginia.

RC&D also helped in developing two industrial sites in Mercer County. On one site, flood-frequency data were provided for the Brush Creek flood plain below Princeton. On the other, channel alterations were designed for Christian's Fork.

In the RC&D project area, interstate highways and Appalachian Corridor highways are under construction, and sediment yield from this construction is enormous.

The RC&D Steering Committee has exerted pressure on contractors and Highway Department personnel in both Virginia and West Virginia to comply with existing regulations for preventing erosion and sediment during highway construction. Results are encouraging.

Our RC&D project has helped stabilize eroding areas at city parks in Princeton and in Bluefield, Va., at the Glenwood Methodist Home for the Aging, at Talcott High School, and at hospital grounds in Princeton and Tazewell. It financed the stabilization of the Hinton Hospital grounds and helped halt massive erosion at Southwest Virginia Community College. Similar assistance is planned for 25 acres of unstable, abandoned, manganese mines in Bland County.

Working with the Southern Soil Conservation District, the East River Improvement Association, and the Neighborhood Youth Corps, the RC&D project is implementing a clean-stream program along East River. In 3 years, two tributary streams have been cleared of trash, and fish habitat has been improved. Techniques that originated in this project have been used by the West Virginia Department of Natural Resources in 40 of the state's 55 counties.

There is more of the Mountain-Dominion RC&D "iceberg" below the surface of the water, but there is little doubt that water is what it's all about. ♦

On an urban conservation tour

SOIL CONSERVATION *magazine recently participated in an urban conservation tour in Anne Arundel County, Maryland. It was an invitation that we were eager to accept because we have long felt that urban conservation tours of the type Maryland has been conducting can be a useful program in most states. Many states are familiar with these Maryland tours—11 states were represented in this year's tour. We found, however, that the inner workings of such a tour are as interesting as the tour itself.*

Fog from the Chesapeake Bay was still quite thick as we arrived at the tour assembly point, the Medford Armory near Annapolis; the poor visibility would have been an evil omen for any tour.

The drill hall of the armory was already crowded when we made our way to the table where Maryland's acting state conservationist John Gibson presided, collecting $5 tour fees and dispensing "Hello-My-Name-Is . . ." identification stickers.

Adjusting our ID stickers, we wandered through the hall. Everywhere conservationists, district supervisors, county officers, developers, and educators were greeting each other and forming spontaneous discussion groups. We spotted Bob Hilliard, Connecticut's new state conservationist, and then Jesse Hicks, North Carolina's state conservationist. We asked Hicks about the possibilities for an urban conservation tour in North Carolina, and he told us that interest was so great that 17 North Carolinians had accompanied him for the Maryland tour. We left Hicks with New Jersey's state conservationist, Wilson Parker, and made our way to the crowded tables for coffee.



We discussed conservation education with a schoolteacher from Prince Georges County as we drank our coffee, and then a district supervisor from St. Marys County described Maryland's new Sediment-Control Act to us.

At 9 a.m., after a "last call for coffee," the program began. The opening session consisted chiefly of a welcome from Phillip Scheibe and Raymond Armstrong, chairmen respectively of the Anne Arundel County Council and the Anne Arundel Soil Conservation District. Then we dispersed to the waiting buses.

The fog had lifted, and visibility was now excellent. As we rode to the first stop, our tour guide intro-

duced himself. "I'm Buddy King," said the clear-eyed, sandy-haired Marylander.

King has the ability to communicate conservation information, and his presence kept us from losing our conservation perspective as we observed the green Chesapeake Bay country with its pleasant whitewashed houses and its distinctive naming scheme: St. Margaret's Road, Cape St. Claire, St. Eleanore's Way, and so on.

The first stop was the Westinghouse Ocean Research and Engineering Center on the shore of Chesapeake Bay. The center had successfully combated shore erosion by installing a sloping revetment of random rock. The result was a pleasant shoreline and the best possible conservation structures. Alternative measures such as vertical bulkheads or articulated concrete slabs also would have saved the bay front but would have been far less attractive than the natural rock of the riprap.



Back in the bus, we turned our attention to the impressive tour booklet, which explained what had been done and what was to be seen at each of the five scheduled stops. The booklet had been prepared by the organizations with which the district had worked: Levitt & Sons provided material on its Crofton Park development; Matz, Childs & Associates wrote about the firm's work at the Anne Arundel County Detention Center; the Baltimore Gas and Electric Company gave an account about its conservation work. And Westinghouse not only prepared its own writeup, but printed it as well.

The second tour stop was the Anne Arundel County Detention Center, where, in the latter part of 1967, extensive excavation during construction had presented a serious erosion problem. We looked at photographs showing that the excavated soil had been literally a small mountain. The mountain had been graded down and a system of intercepting berm ditches had been installed. No slope was greater than 3:1 and no higher than 20 feet.

We walked to the site through fields of tall sericea lespedeza, which provided thick vegetative cover and served as food for wildlife. After the inspection, we reboarded our bus and headed back to the armory for lunch.

While we were eating our box lunch—roast beef sandwich, cake, and apple—we asked Ernest Moody, who was recently given the job of district conservationist for Washington, D.C., if there was serious erosion in inner-city Washington. He was quick to answer.

"All too much," Moody said. "For example, there's a corner up on New York Avenue, Northeast, where an exposed hillside has actually collapsed over the sidewalk and into the street. Right in the center of town. I could give you example after example."

We asked what he thought ought to be done. "Work," he replied.

Tour site No. 3, in the Crofton Park suburban area, was a good example of a common problem in urban conservation. Constructing a sanitary sewer along a natural stream necessitated the disturbance of the Crofton flood plain and some of the adjacent slopes.

Levitt & Sons worked with the Maryland Department of Water Resources and the Anne Arundel Soil Conservation District to restabilize the flood plain. The plan included five check dams, the use of riprap, concrete retaining walls, and stream relocation. The holding action of





the natural rocks in the riprap seems particularly beneficial as a stabilizing agent, and we were happy to note that efforts had been made to insure the preservation of trees along the streambank.

The Baltimore Gas and Electric Company had prepared an impressive exhibit showing various aspects of the sediment-control and environmental-improvement programs at their new Waugh Chapel Substation, our fourth stop. We viewed the sediment basins and storm drainage system that BG&E had installed, and we were told of the power company's efforts to incorporate powerlines into an attractive environment.

As we viewed the storm drainage system, we talked to Maryland's John Gibson about the tours.

"We began planning this one a few days after the last one was held. This is our fifth year. We've had tours of Howard, Baltimore, Montgomery, and Prince Georges Counties, and now Anne Arundel. We had intended to stop after five tours, but they have been so successful that we're encouraged to continue them. I personally think that these tours have moved the conservation program forward."

About 350 people were on the tour. We asked Gibson if he had expected so large a turnout.

"We had set a limit of 300 for this tour. Our first tour in 1967 attracted 60 or 80 people; the next year 285; then 350. Last year, for the Baltimore County tour, we wanted only 300 people. The organizational problems for a larger tour are too great."

How much SCS time went into this tour?

"Only about one man-week at the state office. Most of the work was done at the work unit."

Gibson introduced us to Chuck Hancock, district conservationist at Annapolis, who completed the answer to our question about SCS time. "We spent 10 to 12 man-weeks on this tour, I would say. But non-SCS people spent about 4 man-months, including 2 man-months spent by the conservation district secretary. You say other states might be interested in a tour like this? Well, the result is worth the effort, in my opinion, but any state that plans to have an urban conservation tour ought to be prepared to spend a good deal of time in preparation and still maintain its ongoing program."

Other questions were cut short as we reboarded the bus to travel to the fifth and last stop—the Four Seasons development, which has used sediment basins to insure compliance with Maryland's sediment-control laws.

As we walked across the Four Seasons site, we asked Chuck Hancock about the organization of the Anne Arundel tour.

"This tour, like the others, is a cooperative effort of five adjoining conservation districts," he explained. "This is a district program, although the Soil Conservation Service has worked hand-in-hand with the districts. A lot of others also helped —it was the close person-to-person contact that actually pulled this thing off."

What about tour financing?

"This tour cost the host district $4,200. The buses cost about $650, but this expense was divided equally among the five districts. By far, the largest expense was the catering service, $3,500. Now, there's some question about the evening program — some feeling that the dinner is unnecessary. If we don't have a dinner, the catering cost can be cut by $2,500. Most of the cost is absorbed by tour fees and donations."

One last question. We asked, "Would you advise other states to hold urban conservation tours?"

"Definitely. If you've got development going in an urban area and you've been doing conservation work, then you've got all you need for an interesting, educational, and worthwhile tour. All you add is time and effort."—VINCENT J. PRICE, *Information Division, Washington, D. C.* ♦

Review

Books

Makens' Guide to U.S. Canoe Trails. By James C. Makens, Ph.D. *1971. Le Voyageur Publishing Company, 1319 Wentwood Drive, Irving, Texas 75061. 86 pp. $4.95.*

If an awareness of conservation is the natural result of canoeing interest, as the author believes, then this book serves a double purpose. It lists more than 900 canoe trails both alphabetically and by state and contains a fairly extensive bibliography. The descriptions of the trails include detailed information that should be invaluable to canoeists—where to get on and off the trails, where portages are required, where fishing is good, where campsites are available, where and what kinds of wildlife to expect, what stretches are not recommended for novices.

The author warns of hanging trees, narrow channels, swift currents, polluted areas, sharp drops, boulders, and gives the "difficulty rating" for all the trails.

"Like the men she carries in her crest," says the author, "a river can be moody and deceptive." He recommends discovering each river's secrets before entering her waters. This book can help to do exactly that.—P.A.C.

New publications

Proceedings of Joint Meeting of Government Operations Research Users and Producers. *1971. U.S. Department of Commerce, National Bureau of Standards NBS Special Publication 347. 153 pp., illus. $1.25.* This meeting, the second in a planned series of meetings, had for its purpose the longer range goal of providing more responsive and more adequate studies for improving government agency management and productivity. Government agencies report on what they expect of their operations research producers, what they expect to have done with the results, and the purposes and uses of systems analysis. Universities report on their capabilities and the operations research projects currently in progress on their campuses.

The Quest for Environmental Quality, Federal and State Action, 1969-70, Annotated Bibliography. *1971. Advisory Commission on Intergovernmental Relations. 63 pp. $0.35.* Reports on the legislative and administrative actions of federal and state governments and provides an annotated bibliography on environmental quality.

Drought Bibliography. By Wayne C. Palmer and Lyle M. Denny. *1971. U.S. Department of Commerce, National Oceanic and Atmospheric Administration NOAA Technical Memorandum EDS 20. 236 pp.* Compilation of 3,150 references on agricultural, hydrologic, and meteorological drought. Covers the literature through 1968.

Guide to Federal Consumer Services. By Virginia H. Knauer. *1971. Office of Consumer Affairs, Executive Office of the President. 151 pp. $1.* Lists the consumer services of every federal agency or bureau that is either directly or indirectly concerned with consumer issues. Also cites publications available from federal agencies.

Design Manual — Soil Mechanics, Foundations, and Earth Structures. *1971. U.S. Department of the Navy, Naval Facilities Engineering Command NAVFAC DM-7. [308] pp., illus. $2.75.* Design guidance on soil classification; exploration and sampling; laboratory tests and test properties; field tests and measurements; distribution of stresses and pressures; analysis for settlement, stability, seepage, and drainage; compacted embankments, compaction procedures, and hydraulic fills; walls and retaining structures; spread foundations; deep foundations; pile foundations; pressures on buried structures; soil and rock stabilization; and frost, vibration, and seismic effects.

Herbicide Manual for Noncropland Weeds. *1970. U.S. Departments of the Army, the Navy, and the Air Force—Army, TM 5-629; Navy, NAVFAC MO-314; Air Force, AFM 91-19. [217] pp., illus. $1.75.* Practical instruction on the classification, use, and application of herbicides; detailed information regarding specific weed species and site situations; and unique characteristics and properties of specific herbicides suggested for noncropland use.

Meetings

December

26-31 American Nature Study Society, Philadelphia, Pa.

26-31 American Association for the Advancement of Science, Philadelphia, Pa.

January

12-13 National Council of Farmer Cooperatives, Phoenix, Ariz.

19-22 National Woolgrowers Association, Phoenix, Ariz.

23-27 American National Cattlemen's Association, Denver, Colo.

23-27 National Association of Home Builders, Houston, Tex.

Recon . . .

Everybody does it—but people between the ages of 21 and 35 litter nearly twice as much as those in the 35 to 49 age bracket and three times as much as people over 50. And men litter nearly twice as much as women.

SCS was one of 13 agencies of seven federal departments that received a special citation last month from Keep America Beautiful, Inc., the national organization for the prevention of litter, during KAB's 18th annual meeting in Washington, D.C.

The agencies were cited for their "immeasurable contributions to the furtherance of the overall campaign to improve the nation's outdoor environment through litter-prevention."

William B. Davey, SCS Deputy Administrator for Field Services, accepted the citation for SCS.

Yesterday it was trash. Efforts to utilize waste by creating new products out of recycled materials continue. Some new achievements: Westinghouse Research Laboratories' new simulated cabinet-quality "wood," made from a 50-50 mixture of wastepaper and scrap plastic; Goodyear Tire Company's artificial turf, made from wornout tires; Cellutron Products' house insulation, made by fireproofing shredded newspapers; and UCLA's new planks and bricks, made from a combination of powdered glass and cow dung.

Consumer product information catalog. Nearly 200 low-cost federal government booklets containing valuable information are listed in the latest edition of a free 16-page Index of Consumer Product Information, a catalog developed by the General Services Administration's Consumer Product Information Coordinating Center with the cooperation of the President's Office of Consumer Affairs.

Listed publications can be ordered by using a form contained in the catalog. Some of those listed are also available at 27 Federal Information Centers around the nation. The publications advise consumers how to buy, use, and take care of products. They cover many areas including building, buying, and financing a house, making home repairs and improvements, budgeting, shopping, and health.

For free copies of the Index, write to Consumer Product Information, Washington, D.C. 20407.

"Earth Control" was suggested as the slogan for a recent 2-day conference on environmental education held in Berkeley Springs, W.Va., and sponsored by the Office of Education (HEW) for representatives of federal and private agencies.

No smoking. With leaf burning now illegal in cities in Winnebago County, Illinois, the local conservation district is working with the city of Rockford and nearby farmers to provide for leaf disposal. District conservationist Lyle Palmer reports that under agreements with the farmers the city will be allowed to haul leaves to agricultural lands where they will be plowed under.

Not for sale. Stevens Point, Wisconsin, needed a sanitary landfill. The Portage Soil and Water Conservation District, using a just-completed soil survey, helped locate a very promising site. James Laszewski, the owner, was approached and asked if he would sell the site. Laszewski wouldn't sell. Being not only concerned about the environment but also civic-minded, he donated the 40-acre tract to Portage County through the SWCD.

Montana mosquitoes? "They're some of the worst there is," says Don Messer, district conservationist in Malta, Montana.

Scheduled for construction next spring is an SCS-designed diked pond in Malta. Planned as part of a continuing program for mosquito control, the pond will be stocked with the mosquito-larva-eating Zambusia fish. A hot-water well, the source of water for the pond, will insure that the fish survive the Montana winters.

City officials in Fremont, California, have asked SCS to help them in zoning land for a "greenbelt." The city covers an area larger than Los Angeles, and city fathers are anxious not only to preserve open space but also to retain agricultural land within the city limits.

Town and country soils. Plans are underway to include "soil interpretations for urban uses" in Oklahoma City's 1972 International Land Judging School and Contest. Participants will have the opportunity to judge a soil profile for nonagricultural or urban uses. They will not be scored on this.

"The new concept of conservation . . . as populations grow and people live in greater concentrations, we must consider the total environment, not just those values that can be measured in dollars. We must take account of such values as space for growing and living, pollution control, recreation, wildlife, and the beauty of nature. This is the approach employed in evolving and carrying out watershed projects."—J. PHIL CAMPBELL, *undersecretary of Agriculture. (Address to the Natural Resources Management and Conservation Committee of the National Association of Manufacturers)*

W. D. Farr, a cattleman from Greeley, Colo., who is also president of the American National Cattlemen's Association and a member of the nation's Water Pollution Advisory Board, in an interview in the fall issue of *International Harvester Farm magazine,* cited Lake Michigan as an example of how

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"we're spoiling the world around us for generations to come. Even if we start now," he said, "it'll take 20 to 40 years to really make a decent lake out of it again." On what the Water Pollution Advisory Board needs to do: First, studies to determine the real severity of problems; then, action to lower fertilizer application rates or make sure of slower, more efficient release rates of fertilizer into soil. And what kinds of federal incentives for farmers to get them spending more on pollution abatement? He favors continued support for soil conservation practices and projects with financial backing from federal agencies.

Dr. Philip Handler, the 1970 W. O. Atwater Memorial lecturer, has noted that our science-based technology is not only basic to our material well-being but is "responsible for the New Enlightenment itself," which, he fears, is mistakenly becoming antiscience. Dr. Handler, a former professor of biochemistry at Duke University, past member of the President's Science Advisory Committee, president of the National Academy of Sciences, and editor of the book, *Biology and the Future of Man,* struck hard at "scientists who have occasionally exaggerated the all-too-genuine deterioration of the environment or have overenthusiastically made demands which, unnecessarily, exceed realistically realizable—or even desirable—expectations. The nations of the world may yet pay a dreadful price for the public behavior of scientists who depart from established fact or indulge themselves in hyperbole."

The forest primeval. SCS woodland conservationist C. M. Henninger is quietly working to preserve the remaining natural forest in Tennessee, by bringing rare tracts to the attention of the Tennessee Department of Conservation. Recently he pointed out a 1,000-acre grove that Max Young, a planner in the department, considers to be very close to virgin forest. It is hoped that the area can be preserved.

"We sometimes come across 8 or 10 acres that are a remnant of the original ecosystem," says Henninger, "and if there is a way that these areas can be preserved, they ought to be."

Drip! Drip! Drip! One of the most promising irrigation practices being developed is "trickle" or "drip" irrigation in which a microporous or finely perforated tubing system placed at or below the surface of the soil delivers water continuously and directly to the root zone. Early tests in this country demonstrate the system's potential for saving time, money, and water, while increasing crop yields.

Human environment conference. The first worldwide, government-level conference on the environment will meet June 5 to 16, 1972, in Stockholm, Sweden, under United Nations sponsorship. As a preliminary, each nation has prepared reports on environmental problems and treatment measures. The U.S. study, a readable, long-range view of conservation prospects, reflects strong inputs from SCS and the Department of Agriculture. The 54-page booklet—*National Report on the Human Environment*—is available for $0.40 from the Superintendent of Documents, Washington, D.C. 20402. Refer to Department of State Publication 8588.

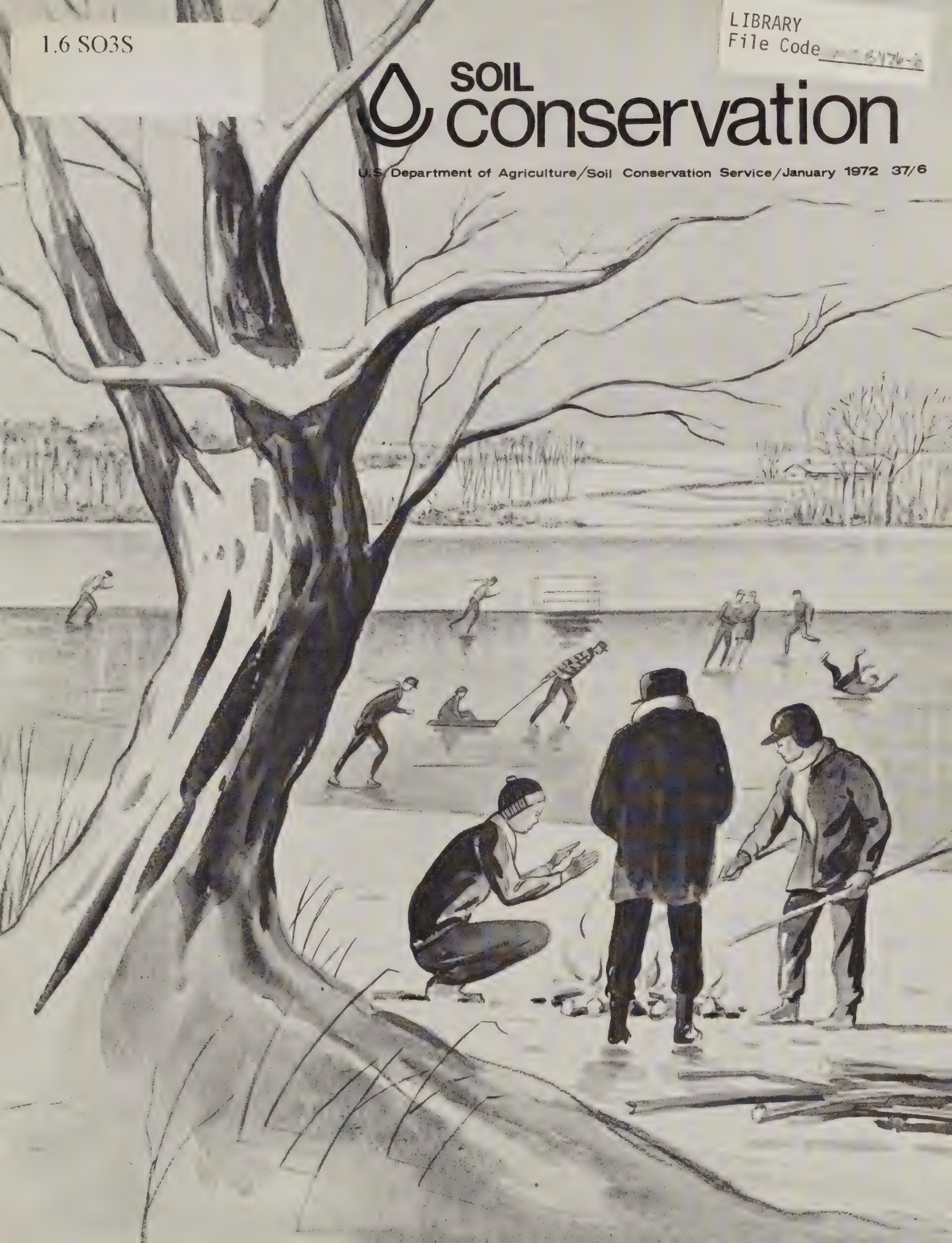
Back to the old grind. A 4-year study of refuse grinding in Madison, Wisconsin, showed that milled refuse disposed of in a landfill, without a daily cover of earth, produced no objectionable odor and no undue rodent and fly problems. Grinding refuse and eliminating the daily cover of earth can result in landfill space saving of 35 to 50 percent. The cost of such a landfill operation is somewhat higher than a standard sanitary landfill, but this is offset by a saving in land.

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SOIL conservation

January 1972, Vol. 37, No. 6

This month SOIL CONSERVATION looks to the past and to the future. Our annual report tells of last year's efforts by SCS in improving the quality of human environment. And a year-end roundup sums up SCS activity or accomplishments in each state during 1971.

SCS has been re-thinking its mission and programs as evidenced by a framework plan, which is the subject discussed in an interview with SCS Administrator Kenneth Grant by Hubert Kelley.

COVER: An original drawing done specially for SOIL CONSERVATION by Felix Summers, technical illustrator at SCS's Midwest Regional Technical Service Center, Lincoln, Nebraska.

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

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A framework plan for the Soil Conservation Service

An interview with Kenneth E. Grant, Administrator, Soil Conservation Service

In October 1971, the Soil Conservation Service published a key document: "Soil and Water Conservation for a Better America . . . A Framework Plan." The result of 2 years' work by a number of experienced SCS people, this plan represents an attempt to look ahead to the mission and future activities of the soil and water conservation program in America. Shortly after publication of the plan, SCS information director Hubert Kelley questioned Administrator Kenneth E. Grant on the plan—how it came to be written, how it can be used, what it means to the future of the Service. The interview follows:

Question: Mr. Grant, why did you feel it necessary to develop a framework plan for the Soil Conservation Service after nearly 4 decades of SCS operations without one?

Grant: The Service, like every other organization these days, is caught up in a period of rapid change. We frequently find ourselves altering course in midstream without carefully thought-out goals and guidelines. Because I don't think this is a very good way to run an organization, I asked the state conservationists and others familiar with our work to try to agree on a framework plan to help us chart the course of the Service for the next 10 years—or even longer.

Question: What are some of the more significant changes that led you to take this step?

Grant: Many changes are taking place in social values today that are resulting in a

different ordering of priorities. We have become a more discriminating society with higher expectations for a quality life. This has resulted partly from greater purchasing power linked with more leisure time. Americans today are demanding a better balance between material needs and quality surroundings. This leads to a closer scrutiny of the condition of our natural resources and their impact on environmental quality.

Question: Could you cite specific examples of these changes that have had a particular impact on the work of the Service?

Grant: One example is the increased emphasis on pollution. Until a few years ago, sediment wasn't even recognized in many circles as a water pollutant. I felt that SCS, as the USDA agency responsible for soil and water conservation, had an important role to play in the water-quality field. Another change is the increase in livestock feedlots and the water pollution that results from the runoff. This problem came into focus very quickly, and SCS was forced to adapt its techniques to help solve it without the research and field experience that we like to have before we move into a new area. A third change is the growing need for soil survey information by urban planners and developers. You can't change a complex program like the soil survey overnight.

Question: But the Service actually was being pulled into these fields before you had a plan. How does a framework plan change things?

Grant: Too often we have just been reacting to situations instead of looking ahead and coming up with well considered, reasonable guidelines for the future. The framework plan will mean the difference between acting and reacting. It will help us put the soil and water conservation job in perspective—to look at the major components of the job and how they interact and relate to the total.

Question: With technology changing so fast, I should think it would be harder than ever to look into the future with any assurance.

Grant: Well, I would be naive if I thought the Service could look ahead with clarity into 2 or 3 decades. I don't believe any such thing, of course. But I do insist that you have to make the best projections and forecasts you can to guide your future actions, and try to think things through rationally, and not just wait until a problem hits you right between the eyes.

Question: The published plan contains 79 pages. Can you describe it very briefly?

Grant: The first few chapters discuss the social setting, the economic basis, and the anticipated need for soil and water conservation. Chapters 5 and 6 are key chapters; they describe the Service's mission and goals and the thrust that future SCS actions should take. In all, the plan contains 67 major goals, and each is discussed in some detail. Chapter 7 goes into some of the institutional arrangements that will need attention as the plan is implemented. To put it as simply as I can, it is a framework plan that relates our mission objectives to the supply and condition of natural resources and to the benefits that must be achieved to meet quantity and quality goals. It sets forth goals and future needs for changes in resource use and improvement in resource management. It states the goals and broad policy and plans for SCS program activities that hopefully will lead to these changes and to improvements in resource management.

Question: What does the plan foresee as the mission of the Service in the years ahead?

Grant: At the outset, the plan states that the mission of SCS is to assist in the conservation, development, and productive use of our soil, water, and related resources so that all Americans may enjoy, first, quality in the natural resource base for sustained use; second, quality in the environment to provide attractive, convenient, and satisfying places to live, work, and play; and third, quality in the standard of living based on community improvement and adequate income.

Question: Why all this emphasis on quality today?

Grant: We have reached a point in this country where a high proportion of people have good homes, good jobs—many of the amenities of life. A lot of people have achieved many of their material goals. Now they can devote more of their energies to improving the quality of life—quality of education, quality of medical care, quality of the environment. While SCS is still very much concerned about the quantity of our resources, our framework plan also takes note of this new national con-



Kenneth E. Grant, Administrator, Soil Conservation Service

cern for quality. But really our mission embraces both quantity and quality aspects just as it always has.

Question: What do you see as the basic job of Service people in trying to achieve these missions?

Grant: Our basic role is professional assistance that helps users of soil and water resources to plan alternatives that lead to prudent decisions for preventing or correcting misuse of soil and water resources, for developing these resources with full consideration for future needs, and for improving resource management to meet quality standards and updating resource management to accommodate new technology and equipment.

Question: Have Service people in the past showed themselves able to adapt to change?

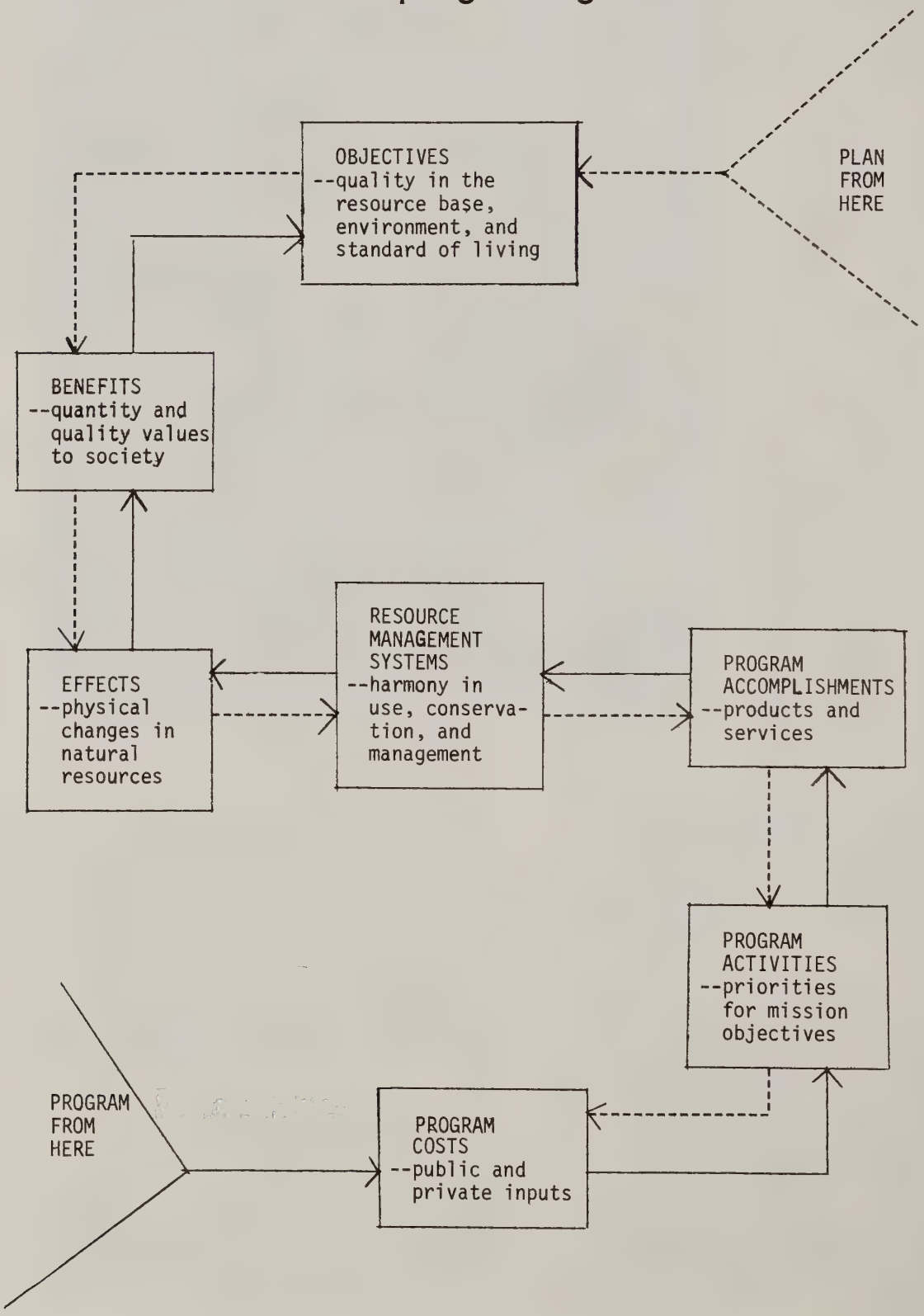
Grant: They certainly have. They have always been very quick to recognize new opportunities to be of service. The SCS program has never stopped growing in scope and complexity. Each year our conservation activities benefit a broader segment of society—both rural and urban.

Question: But with 67 different goals—even though they are related goals—won't field people run the risk of spreading themselves too thin?

Grant: Our people will continue to look to conservation districts to help establish priorities. Together they are going to have to pick and choose those areas in which their efforts will be most productive in meeting high priority needs. It's also part of our job within the Department of Agriculture to help identify what SCS can be

FRAMEWORK IN ACTION—

a model for soil and water conservation planning and programing



expected to accomplish—and what it cannot. Certainly we can't be all things to all people and still perform a quality job.

Question: How can you be sure of getting highly qualified people in changing times like these?

Grant: One way is by keeping our professional standards high. Another is through continuous retraining. You've heard it said that half of what you learn in college is outdated in 10 years. It won't be long before it's outdated in 5 years. That means we'll have to keep sending our employees back to "school"—to brush up on old disciplines and to master new ones.

Question: Thirty years ago, it was possible to hire people with a strong commitment to the conservation ethic. Can you still find such people today?

Grant: Absolutely. More than ever. And it's that commitment that will make this plan a living reality.

Question: The plan foresees an increase in SCS responsibilities in surveying and monitoring. What's so important about these?

Grant: Surveying and monitoring provide data and information about the extent, condition, and rate of change of soil, water, and related resources. It is essential to make periodic surveys and inventories and to monitor the changes taking place in the resource base so that people can make intelligent decisions about resources. Monitoring is a continuous overview of what is actually happening to resources. Monitoring data can be used to relate the past and present conditions of natural resources to quality standards so decisions can be made that provide for quality on a sustained use basis. The gap existing between the actual conditions of natural resources and quality standards indicates to a major degree the magnitude of the soil and water conservation job ahead.

Question: Does the Service have the expertise to assume increased responsibilities for surveying and monitoring?

Grant: I think our people have training second to none in looking at the supply and condition of natural resources and determining what the impact will be when you interject a new force or change into the environment. One example is the annual SCS estimate of land and acreage subject to damage by wind erosion in the Great Plains. Or you could talk about the snow survey, or the Conservation Needs Inventory, or the soil survey, or studies of large river basins. Our people are experienced. We have an excellent base for developing methods and techniques for monitoring other significant changes in natural resource conditions.

Question: Are you overlooking the experience of farmers and ranchers?

Grant: Certainly not. SCS's more than 14,000 employees draw on the experience of 18,000 district directors or supervisors and more than 2 million district cooperators. I remember one farm that had been in the same family since a king's grant in the 1600's. The owner can tell me the sequence of crops and the successes and failures associated with that piece of land for over 300 years. You can't beat experience like that.

Question: The "framework" also predicts a bigger role for SCS in the planning field. Isn't this a new departure for the Service?

Grant: Far from it. In working with individual farmers and land users, we have always insisted that the proper approach to conservation is to develop a conservation plan, rather than attacking problems piecemeal.

Question: But now we're talking about towns and counties and states and even regions.

Grant: True, but we are already proceeding in the same way in this larger area. Our role is to supply both the land users and the professional planner and decision makers with basic information about the probable results of alternative land uses and resource management.

Question: The plan sets forth several planning principles; the first calls for citizen involvement. Why is this so important?

Grant: Some people may disagree, but in my opinion the finest plans are those in which local citizens have participated from the outset. Any plans you work out in isolation today have little chance of succeeding. They are simply exercises in frustration.

Question: Another principle is "interaction." What does that mean in plain English?

Grant: It means that everything you do

about resources interacts in some way with something else. You can't take any action in the environment without setting off a whole series of effects. We're saying that you have to consider these second, third, and even fourth order effects today before you take that first action.

Question: The third planning principle the plan talks about is "flexibility." Isn't that a temptation to give wishy-washy advice?

Grant: No, I don't agree. If anything, our people have occasionally been too inflexible in giving advice to land users. In a country as big as ours, you need enough leeway to respond to change. Who would have predicted just a few years ago the emphasis today on land for recreation, for wilderness, for transportation, or for new towns? We want enough flexibility in our planning to enable people to respond to different sets of conditions—5, 10, or 15 years down the road.

Question: With so many people involved in the planning process these days, the SCS role in planning must be confusing to many employees. Will this plan help clarify things?

Grant: I agree that planning can be extremely complex. But in the framework plan, we have set forth—to the best of our ability at the present time—those important areas in which the Service needs to get more involved and the general guidelines for getting the work done. The plan gives an employee something to relate to in doing his work.

Question: But do you honestly think any plan can be broad enough to meet the needs of such widely disparate areas as, say, Massachusetts or Montana?

Grant: I'm personally convinced that our own plan is that broad. It was developed by people with a full range of experience in various types of locations around the country. This plan has built-in flexibility to meet changing conditions and needs in different locations, whether Maine or Florida or California. The only difference between geographic areas will be the relative importance of goals and future needs and the institutional arrangements that exist for soil and water conservation activities. This is one reason for calling it a "framework plan."

Question: How does this plan tie into "The Future of Districts," published by the National Association of Conservation Districts Outlook Committee?

Grant: The crosswalk between our plan and the district outlook publication will be evident to anybody who reads both of them. Both documents envision a broadened role for districts and the Service. They are entirely compatible. They provide guidance that can make the SCD-SCS partnership even more effective.

Question: Who will be responsible for implementing the plan? The state conservationists?

Grant: The state conservationists helped develop the plan, and they certainly will be using it to guide their operations. But we also will implement the plan at the national and local levels.

Question: And how about the district conservationists?

Grant: The district conservationists will not only have to read the plan but also think about it and discuss it with their colleagues. When you have 3,400 office locations—most of them headed up by a district conservationist—then obviously the success of the plan is entirely dependent on the understanding, participation, and commitment of the district conservationist. With this document, we have established communication of our goals up and down throughout the Service—with our staff people—and from my office through the state conservationist and area conservationist to the district conservationist and the people he supervises. The only way that we can ever hope to achieve the commendable objectives set forth in this plan is to achieve in every Service office a complete understanding of what it contains.

Question: But won't the district conservationist have to be a "super-generalist" to make use of this plan—part agronomist, part sociologist, part ecologist, part soil scientist? Can we expect all this from one person?

Grant: Certainly. The typical district conservationist has been operating very well in many of these fields right along. Of course, we have national, regional, and state specialists on hand to help him, but I think he does very well in his own right. This plan is going to help him even more. ♦

It was a very good year

Summary of activites of the Soil Conservation Service for fiscal year 1971

During 1971, the Soil Conservation Service placed increased emphasis on efforts to improve the quality of living in rural communities and to increase job opportunities through resource development and management, to plan conservation on an areawide basis, and to implement the growing desire of Americans to keep their country beautiful and healthful.

A significant development in this respect was the completion of a framework plan, *Soil and Water Conservation for a Better America*. This plan will guide the Soil Conservation Service in the decade ahead in its mission of assisting in the conservation, development, and productive use of the nation's soil, water, and related resources and thus helping to improve the quality of human environment.

The plan can be useful not only to people with responsibilities in the environmental field within the federal government but also to soil conservation districts, state resource agencies, and private conservation organizations. Its framework is applicable to any part of the country. What will vary from area to area and community to community is the mix and importance of future needs and goals.

The plan comprehensively lists SCS activities under seven categories: resource technology and development, surveying and monitoring, resource conservation planning assistance, installation and maintenance assistance, information support, management support, and international assistance. In 1971 significant progress was made in each of these activities.

Resource technology and development

Changes in land use and management, in equipment, in plants and fertilizers, and in life styles make it necessary to update and improve conservation technology.

Agricultural waste management

Public demand for a quality environment plus enforcement of more rigid air- and water-quality regulations brought rapid advances in agricultural waste management in 1971. The basic concepts—divert clean water, grade feedlots and barnyards, intercept polluted runoff, and treat or utilize the runoff and solid wastes—remain the same, but techniques are constantly being improved.

Drying and refeeding manure mixed with other rations is being tried on cattle, poultry, and hogs. Equipment to compost manure for subsequent sale as an organic fertilizer and soil builder has been developed and is being used successfully by some large beef-cattle enterprises. Experiments are being conducted using the common housefly to process or biodegrade manure. Mechanical aeration techniques are being refined to assist nature in degrading wastes in lagoons. Waste-handling equipment is being developed or modified to improve management of both liquid and solid wastes.

Recycling agricultural wastes to the land and its plant cover remains the most successful method for ultimate disposal.

Soil data

SCS continued to use automatic data processing technology to improve the processing of data about soils. Already operational is a system dealing with soil taxonomy. Under development are systems for rapid preparation of data for soil survey manuscripts and for making substantially more use of interpretative soil data that relate directly to use and management of our soils as a national resource.

Also operational is the Gerber automatic drafting machine. This machine, designed to draft press-ready negatives of soil maps, is presently being used for precision drafting of control and acreage grids and photographic line screens. Under development is a system for drafting digitized maps at any selected size up to 5 feet by 8 feet.

Plant materials

A creditable number of new plants were released by SCS plant materials centers and their cooperators during 1971. They were distributed through state crop-improvement associations and soil conservation districts and are now in commercial production. Some of the new plants are:

Barton western wheatgrass — from Kansas, for improved forage and soil stabilization.

Bend sand lovegrass—from Kansas, an outstanding variety adapted to sandy soils in south central Kansas and north central Oklahoma; for grazing and soil stabilization.

Mason sand lovegrass — from Texas, vigorous and leafy, well adapted to sandhill areas; for forage and stabilization.

Cape American beachgrass — from New Jersey, outstanding vigorous clone; for tying down eastern coastal sand dunes.

Critana thickspike wheatgrass—from Montana, a stabilizing plant for such critical areas as airports, industrial parks, and highway banks.

Marshfield big trefoil — from Oregon, a new vigorous strain adapted to wet lands; for pasture or use as a legume in seepy critical areas.

Arnot bristly locust—from New York, adapted to much of the eastern half of the United States; for stabilizing, screening, and beautifying acid mine spoils, highway banks, and sterile borrow areas.

Rem-Red Amur honeysuckle—from New Jersey, provides late winter "raisined" food for songbirds; its bright red berries are highly ornamental through fall and early in winter.

Surveying and monitoring

Surveying and monitoring provide resource information needed in research, in establishing resource use policies, and in planning resource management systems.

Soil surveys

SCS continued to accelerate the publication of soil surveys. In fiscal year 1971, 60 were sent to the printer—the most ever in any one year (40 soil surveys were sent in FY 1970). Also, 1,074 special soil-interpretation reports were prepared and made available for local use. In FY 1970, 529 similar reports were prepared.

The demand for soil surveys and the ways in which they are used continued to increase. More and more urban planners, developers, and engineers used soil surveys and soil maps to avoid the costly mistakes that can result from building houses, schools,

factories, and roads on soils having severe limitations for these purposes. Soil interpretations were broadened to better serve the multifarious users.

Conservation Needs Inventory (CNI)

The *Basic Statistics* of the 1967 Conservation Needs Inventory was published in January 1971. In November a color brochure on the CNI, *Two Thirds of Our Land,* was sent to the Government Printing Office. In addition, publication of a comprehensive interpretative report is being considered.

Forty-two individual state CNI reports have been received plus a number of brochures on state and county findings. County data are also being published, and some states report that all counties have issued reports.

The 1967 CNI data already in the data bank are being reviewed, certain entries are being corrected, and soil names are being introduced to increase the effective use of the data. It is proposed that soil interpretations for each kind of soil listed in the CNI data bank be added to the CNI data file. Four pilot states —Ohio, Indiana, Kansas, and Nebraska — are testing procedures.

Monitoring—natural resources

The Soil Conservation Service continued in the development of a natural resource monitoring capability. This was made necessary by the accelerated planning at local and state levels of government, especially in areas of critical environmental concern and those areas of high-intensity land use or rapid change in land use.

As set forth in the SCS framework plan, remote sensing developments will become increasingly important in resource monitoring. USDA is watching and evaluating developments in remote sensing and is planning to participate modestly in testing selected outputs from the first Earth Resources Technology Satellite (ERTS) scheduled for launching by NASA next spring.

In 1971, the Soil Conservation Service voluntarily developed and put into action a nationwide program to support efforts to preserve and protect rare and endangered species of plants and animals. This program places the SCS field force—cooperating with concerned agencies and groups—on the lookout for habitat changes, land use changes, or other changes in the landscape that may affect the rare species adversely. SCS people notify proper state and federal authorities when this takes place.

Monitoring—snow and water supplies

The Soil Conservation Service Snow Survey and Water Supply Forecasting Program continues to grow in popularity in the Western States. It is a good example of cooperative effort—37 percent of last year's program was paid for by cooperating agencies.

New uses for snow survey data were found, including evaluating potential for winter sports areas and predicting snow loads for design of structures. Snow survey data have long been used in predicting irrigation supplies and power generation. Snow precipitation was monitored for some of the Bureau of Reclamation studies made of weather modification through cloud seeding.

Snow survey data are finding a use in water management for pollution control. With knowledge of predicted rates of streamflow available, assimilative capacity of streams can also be predicted and allowable rates of waste discharges determined in advance.

Resource conservation planning assistance

Revitalizing rural America continued to be one of the most important facets of Soil Conservation Service work during 1971. The goal of this effort is to build, through the development and use of soil, water, and related resources, a more prosperous and more attractive rural America with full opportunity for the social and cultural development of people, for higher per capita and family income, for more adequate community facilities, and for stopping the rural-to-urban migration of population.

Rural development involves change, and SCS programs are designed to bring about change. Change may come in terms of increased employment opportunities and higher incomes. It may mean a new water-supply system or other community facilities. Change may include development of a lake or stream for recreational use. And it may come in the form of institutional developments for training or retraining people in the skills and arts demanded by society.

National and regional

SCS assisted in developing policies and plans for achieving national soil and water conservation objectives. It continued to give priority to regional planning

that considers the conservation and safe use of land and water resources and that facilitates state and local resource planning.

State and area

Watershed projects. The watershed program, one of the early efforts of Congress toward environmental improvement, was designed originally to help local sponsoring groups control erosion, reduce sediment, and prevent floods. Water supply, recreation, fish and wildlife, and other multiple-purpose features are added benefits that provide a means for people to meet broad and positive community aims. Watershed projects also bring many new jobs to rural towns.

During the fiscal year, federal assistance was furnished to sponsors of 1,045 projects. Initial agreements for construction were signed for 36 projects located in 22 states, bringing the total to 760 projects that have entered the construction stage. Sponsors of 323 projects had completed the construction of all measures by the end of 1971. A total of 306 projects have now completed all planned construction and related land-treatment work.

Local sponsors submitted 85 new applications for assistance during the fiscal year. Planning assistance had been authorized for a total of 1,622 projects by the end of the year, leaving a backlog of 1,309 unserviced applications.

A total of 1,045 projects were approved for Department help. And 42 plans were awaiting approval by Congressional committees at year's end.

The multiple-purpose concept is strongly reflected in projects planned during fiscal year 1971. Of the 1,045 plans approved for operations, 58.6 percent included more than one purpose.

Resource conservation and development projects. In September 1971, 20 new RC&D projects, covering nearly 72 million acres in 133 counties in 21 states, were authorized for planning assistance by the Department of Agriculture. This addition brought the number of projects underway across the country to 98, covering 372.5 million acres. The Department recognizes resource conservation and development projects as a real force in meaningful rural and community development.

The objective of RC&D projects is to improve the use of the project area's natural resources and the economic and social conditions of its people. Each RC&D project covers an area where the potential is high for boosting income and increasing community facilities.

The Little Colorado River Plateau Project, for example, covers the Hopi Indian Reservation, the Navajo Indian Reservation (Arizona), and two northeastern Arizona counties — 16.2 million acres. Its headquarters are in Holbrook, Ariz. Project goals include stabilizing the livestock industry through improved range vegetative cover, development of water and timber resources, improvement of sewage treatment and disposal, introduction of specialty crops, improvement of transportation facilities, establishment of markets for the area's farm products, and development of new recreational areas. Sponsors include the Hopi and Navajo Tribal Councils.

SCS provided leadership in fiscal year 1971 in moving forward more than 7,000 project measures. More than 1,100 of these were completed during the year. Project measures are aimed at solving a wide variety of problems in agriculture, forestry, industry, employment, and community facilities.

Units of government

More than 22,800 units of state and local government received help from SCS in 1971. SCS provided 10,931 resource inventories and evaluations to planning commissions or other agencies of local or state government. It made field investigations and recommendations on land use and treatment of proposed sites for 2,042 public facilities such as schools, hospitals, sanitary landfills, transportation facilities, recreation areas, and water and sewer facilities.

In 1971, SCS responded to increasing requests from local and state governments for resource data essential to developing land use and treatment ordinances. Four hundred and sixty-nine land use regulations, zoning ordinances, sanitary codes, and building codes or standards were issued or enacted by government bodies, using soil surveys and other technical information provided by SCS.

An increased number of community and regional planning workshops were conducted for SCS personnel to help increase their contribution to local comprehensive planning programs. A specialist in community and regional planning was added to the national staff to intensify the Service's efforts in this important field.

SCS participated in a series of joint meetings with several chapters of the American Institute of Planners. These meetings helped give professional planners a better understanding of the planning capabilities available from SCS on land use and conserva-

tion treatment. Such contacts have led to SCS personnel being assigned to full- or part-time service on the staff of regional planning commissions.

Group and individual

During 1971, the Soil Conservation Service continued its planning assistance to individual land owners and users cooperating with the more than 3,000 soil and water conservation districts throughout the country. SCS also sharply increased help to groups and organizations ranging from two or three land owners to many land owners forming large single interest and multi-interest associations. SCS people helped prepare nearly 70,000 conservation plans covering more than 28.7 million acres and helped revise 32,393 plans covering more than 20.3 million acres. More than 586 million acres of private land in the United States now are covered by conservation plans that insure resource protection and proper land use.

Great Plains Conservation Program. Severe drought struck the Southwest in 1971, and the excessive damage to farms and ranches in the Great Plains Region points to the necessity for the high priority that SCS gives to the Great Plains Program. Through long-term contracts under the Great Plains Program, farmers and ranchers apply needed conservation treatment on their land in the 453 designated Great Plains counties. Priority is given to cropland that is unsuited for sustained cultivation but is still used for that purpose. About 20 percent of all cropland in Great Plains Conservation Program contracts is planned for conversion to rangeland.

In 1971, 2,368 farmers and ranchers placed more than 4 million acres under Great Plains Program contracts. More than 40,000 farmers and ranchers now either have completed or have underway contracts for conservation treatment of more than 72 million acres.

Wind erosion in the Great Plains reached a 14-year high last season—the 4.7 million acres damaged indicating the worst years since 1956-57 when 10.3 million acres underwent extensive soil movement. The erosion marks a serious increase from the all-time low of 995,150 acres damaged in 1968-69. An SCS survey showed 2.7 million acres of land damage in west Texas alone. Most of this season's damage was on lands insufficiently protected by the residues of the previous year's crops. Emergency tillage was effectively used to protect 3.9 million acres.

Installation and maintenance assistance

Conservation districts, by the end of fiscal year 1971, had more than 2.2 million cooperators who were applying and maintaining soil and water conservation practices on 766.5 million acres.

SCS recognizes that conservation measures must be carefully planned, installed, and maintained. SCS provides onsite technical assistance for applying measures if needed to insure quality control and to implement new techniques. In FY 1971, SCS provided 2.9 million technical services to 1.1 million individual land owners and users in conservation districts.

SCS will continue to assist units of state and local government, private organizations, and land users in inspecting completed work and in maintaining resource management systems according to quality standards.

Management support

In 1971, the Soil Conservation Service reviewed all of its program policies and procedures to insure appropriate steps to bring about maximum environmental quality enhancement in its work. For example, revegetation and other sediment-reducing measures are applied concurrently with or immediately following all soil-disturbing conservation operations under direct control of SCS.

International assistance

The Service's international reputation for soil and water conservation expertise continued to generate requests for assistance from developing countries. In 1971, SCS had 20 top field specialists in India helping with water-management demonstration projects. Three men were assigned to Nigeria, two to Tunisia, and one to Thailand to assist with soil and water conservation programs. Short-term consultants were assigned to Brazil and Argentina under an agreement with the Organization of American States. And a number of other nations requested and received help in solving their soil and water conservation problems.

During the year the Service assisted 407 individuals coming from 40 countries to observe and gain experience in various aspects of soil and water conservation. ♦

Summary of Progress, Fiscal Year 1971

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Progress items	Total reportable progress	Cumulative to June 30, 1971
Conservation plans and related services		
District cooperators ..... No.	86,792	2,237,093
" " ..... acres	33,190,135	766,515,440
Cooperators canceled ..... No.	56,724	—
" " ..... acres	20,326,594	—
Recipients of technical assistance ..... No.	1,130,377	—
Technical services ..... No.	2,942,006	—
Recipients applying practices ..... No.	673,972	—
Special mapping for planning and CNI ..... acres	8,890,428	291,079,767
Conservation plans prepared ... No.	69,863	1,763,067
" " " ... acres	28,794,134	586,357,175
Conservation plans canceled ... No.	42,879	—
" " " ... acres	15,709,193	—
Conservation plans revised ... No.	32,393	—
" " " ... acres	20,393,049	—
Inventories and evaluations prepared ..... No.	49,766	—
Federal lands in coordinated conservation plans ..... No.	145	1,109
" " " ... acres	2,132,928	13,304,984
State and county CNI reports ..... No.	230	—
Resource planning and implementation		
Services on resource plans ..... No.	76,753	—
Units of government assisted ..... No.	22,838	—
Resource plans prepared ..... No.	1,204	—
Inventories and evaluations for resource plans ..... No.	10,931	—
Land use regulations established ..... No.	468	—
Site selection for public facility ..... No.	2,042	—
Operating units		
Total operating units ..... No.	—	4,478,433
" " " ..... acres	—	1,386,509,910
Other land units ..... No.	—	4,187,682
Resource planning units ..... No.	—	82,874
Group plans, services, and installation plans		
Group plans prepared ..... No.	2,967	11,897
" " " ..... acres	2,327,782	12,889,658
Group inventories and evaluations ..... No.	4,293	57,150
" " " ..... acres	4,740,812	49,774,425
Groups assisted ..... No.	12,559	—
Services to groups ..... No.	77,098	—
Groups applying practices ..... No.	4,246	—
Great Plains Conservation Program		
GP applications received ..... No.	3,689	45,956
" " " ..... acres	7,147,310	88,447,657
GP applications canceled ..... No.	1,406	—
" " " ..... acres	1,694,344	—
GP contracts signed ..... No.	2,368	40,147
" " " ..... acres	4,098,454	72,092,334
GP contracts terminated:		
By mutual consent ..... No.	105	1,208
" " " ..... acres	157,337	1,705,995
For cause ..... No.	37	862
" " ..... acres	40,725	794,185
By expiration ..... No.	3,361	20,793
" " ..... acres	6,193,892	34,990,421
(Total terminations) ..... No.	(3,503)	(22,863)
" " ..... acres	(6,391,954)	(37,490,601)
Cropland before GP contract ..... acres	708,495	11,178,776
Planned cropland conversions ..... acres	144,491	2,250,930
Servicing other USDA programs		
Referrals serviced:		
REAP—F. Y. 1971 ..... No.	256,992	—
" —P. Y. 1970 ..... No.	—	285,909
Cropland Adjustment Program ..... No.	28	—
Appalachian Program ..... No.	1,263	—
Conservation plans approved ... No.	2,173	—
Soil surveys		
Detailed soil surveys ..... acres	36,905,054	748,226,618
Reconnaissance ..... acres	1,067,947	30,104,829
(Total surveys) ..... acres	(37,973,001)	(778,331,447)
Soil conservation surveys ..... acres	—	23,606,919
Soil conservation surveys canceled or converted ..... acres	1,278,922	—
Snow surveys and water supply forecasting		
Snow course measurements ... No.	6,659	—
Aerial snow marker readings ..... No.	960	—
Mountain precipitation gage readings ..... No.	1,790	—
Soil moisture station readings ..... No.	1,417	—
River stations for which numerical forecasts issued ... No.	465	—
Numerical forecasts issued ... No.	2,055	—
Recreation developments		
Land owners and operators who have:		
Established their first commercial recreation enterprise ... No.	1,556	60,055
Expanded or added to commercial recreation enterprises ... No.	955	—
Changed to recreation enterprises as their primary source of income ..... No.	195	10,778
" " " ..... acres	51,743	2,241,752
Private noncommercial recreation facilities established or expanded ..... No.	32,296	549,150
Public recreation facilities established or expanded ..... No.	524	37,493
Watershed and RC&D project measures		
Reservoir type structure sites investigated ..... No.	434	—
Flow control structure sites investigated ..... miles	600	—
Reservoir type structure sites surveyed ..... No.	483	—
Flow control structure sites surveyed ..... miles	903	—
Public fish, wildlife, and recreational developments:		
surveyed ..... No.	25	—
designed ..... No.	23	—
under construction ..... No.	20	—
Reservoir type structures designed ..... No.	745	—
Flow control structures designed ..... miles	608	—
Services provided on land rights agreements and contract awards ..... No.	23,023	—
Reservoir type structures under construction ..... No.	1,298	—
Flow control structures under construction ..... Miles	1,033	—

Summary of Progress, Fiscal Year 1971

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Practices	Total reportable progress	On the land June 30, 1971
Bedding ....acres	48,029	687,888
Brush control ....acres	4,049,869	48,250,604
Chiseling and subsoiling ....acres	732,207	7,522,499
Clearing and snagging ....miles	954	6,549
Commercial fish ponds ....acres	10,309	59,198
Conservation cropping system ....acres	21,991,680	198,453,695
Contour farming ....acres	3,368,473	48,713,298
Critical area planting ....acres	148,207	4,757,980
Crop residue management ...acres	20,528,863	165,561,626
Dam, diversion ....No.	396	27,055
Dam, multiple-purpose ....No.	275	6,001
" " " acre-feet	140,760	12,983,450
Debris basin ....No.	1,711	86,181
Deferred grazing ....acres	12,723,086	71,500,937
Dike ....miles	326	10,973
Disposal lagoon ....No.	987	1,632
Diversion ....miles	2,070	98,639
Drain ....miles	25,455	804,895
Drainage field ditch ....miles	5,971	181,201
Irrigation canal or lateral ...miles	228	45,936
Irrigation ditch and canal lining ....miles	976	26,866
Farmstead and feedlot windbreak ....acres	38,335	723,468
Fencing ....miles	4,198	452,930
Field border ....miles	1,302	48,733
Irrigation field ditch ....miles	1,534	125,504
Field windbreak ....miles	4,061	90,789
Firebreak ....miles	2,428	19,655
Fishpond management ....No.	60,922	597,694
Fish raceway ....feet	65,383	151,913
Fish stream improvement ....feet	173,744	1,065,748
Floodwater diversion ....feet	29,135	1,472,830
Floodwater-retarding structure ....No.	360	10,859
" " " ...acre-feet	222,942	5,492,569
Floodway ....feet	105,891	3,891,107
Grade stabilization structure ....No.	10,297	223,066
Grassed waterway or outlet...acres	57,473	1,846,138
Grazing land mechanical treatment ....acres	55,863	1,453,381
Hedgerow planting ....miles	324	24,612
Hillside ditch ....miles	50	3,334
Irrigation pipeline ....miles	3,284	80,113
Irrigation pit or regulating reservoir ....No.	1,121	48,795
Irrigation storage reservoir ....No.	409	40,671
" " " ...acre-feet	19,269	9,515,639
Irrigation system, sprinkler ...No.	4,281	126,616
Irrigation system, surface and subsurface ....No.	4,822	150,448
Irrigation system, tailwater recovery ....No.	1,015	14,485
Irrigation water management ....acres	4,128,770	19,960,112
Land grading for drainage ...acres	32,939	455,389
Land leveling for irrigation...acres	322,375	11,250,282
Land smoothing ....acres	264,462	6,923,490
Livestock exclusion ....acres	410,215	7,501,118
Main or lateral drainage ....miles	5,715	352,393
Minimum tillage ....acres	2,160,865	21,804,073
Mulching ....acres	129,023	710,557
Pasture and hayland management ....acres	10,984,159	59,396,600
Pasture and hayland planting ....acres	2,964,395	66,643,838
Pipeline ....miles	2,595	29,588
Planned grazing systems ....acres	6,237,268	29,845,332
Pond ....No.	49,305	1,813,320
Prescribed burning ....acres	479,053	4,688,358
Proper grazing use ....acres	66,625,877	239,320,806
Pumping plant for water control ....No.	2,136	68,692
Range seeding ....acres	478,369	15,170,743
Recreation area stabilization ....acres	3,893	114,296
Recreation area improvement ....acres	91,755	828,522
Recreation land grading and shaping ....acres	55,311	330,251
Recreation trail and walkway ....miles	490	7,654
Road, access ....miles	2,382	18,056
Spring development ....No.	4,209	122,710
Stock trails and walkways ...miles	77	4,164
Streambank protection ....miles	401	7,588
Stream channel stabilization ....miles	22	719
Stream, open channel ....miles	869	15,976
Stripcropping ....acres	487,462	20,920,638
Structure for water control ...No.	64,255	2,103,448
Terrace, basin ....miles	163	1,993
Terrace, gradient ....miles	9,962	750,051
Terrace, level ....miles	7,805	385,258
Terrace, parallel ....miles	7,113	76,277
(Total terraces) ....miles	(25,043)	(1,213,579)
Toxic salt reduction ....acres	45,258	1,561,331
Tree planting ....acres	360,105	19,424,875
Trough or tank ....No.	12,229	476,916
Waterspreading ....acres	28,131	933,320
Well ....No.	7,308	495,901
Wildlife upland habitat management ....acres	5,451,597	29,305,663
Wildlife wetland habitat management ....acres	466,069	3,936,767
Wildlife watering facility ....No.	1,323	17,748
Woodland direct seeding ....acres	18,438	571,422
Woodland improved harvesting ....acres	1,405,043	30,373,605
Woodland improvement ....acres	468,859	14,872,701
Woodland pruning ....acres	35,150	122,690
Woodland site preparation ...acres	212,530	4,186,246
Land treated		
Land adequately treated ....acres	41,834,187	699,627,817
Land protected during development ....No.	356	1,026
" " " ....acres	10,722	32,197
Land use conversions [1]		
Cropland to grassland ....acres	991,943	24,739,822
Cropland to woodland ....acres	62,891	2,793,891
Cropland to wildlife-recreation ....acres	47,927	1,360,917
Cropland to "other" ....acres	68,440	5,277,061
All other uses to cropland ...acres	154,581	7,072,235
All other uses (except cropland) to wildlife-recreation ....acres	418,614	7,802,916

[1] Conversions on the land June 30, 1971, are estimates of conversions since July 1, 1962.

1971: a year of achievement

In 1971, the tempo of SCS action was fast, and the level of achievement was high. SCS responded to different needs in different states: in New Jersey, developing land; in Washington, open space; in West Virginia, strip mines. And it coped with problems that are national in scope—urban conservation, for example, and disposal of animal wastes.

On the following pages, SOIL CONSERVATION presents a state-by-state roundup of major Service achievements during 1971. This roundup is by no means comprehensive, but it presents at least an overview of SCS activity in the second year of the seventies.

Alabama: Improving the environment through the use of animal-waste disposal lagoons was a high-priority program in 1971. SCS joined several other federal and state agencies in helping farmers install 138 lagoons. These provide disposal facilities for 13,500 animal units annually—175,600 tons of animal waste.

Alaska: Alaskans continued to show an interest in the need for revegetation for erosion control and esthetic purposes. Responding to requests, SCS provided vegetative and related treatment recommendations as well as onsite assistance to local, state, and federal agencies, private industry, farmers, ranchers, and other landowners.

Arizona: It was an RC&D year in Arizona. The Little Colorado River Plateau RC&D Project was approved for operations; the Cocopai RC&D Project was authorized for planning and was assigned a project coordinator; the Coronado RC&D Project was established and was assigned a resource conservationist; the Hohokam RC&D Project, though not yet approved for federal funds, completed several project measures. Work began in establishing the Lower Colorado RC&D Project for the western part of the state.

Arkansas: All SCS professional people received training in collecting and organizing conservation and resource development information. Each district now has color-coded maps to locate resource and conservation problems and to show soil limitations for various uses. The information is used extensively by city and regional planners.

California: This state put soil conservation districts squarely into the total resource field with legislation that, among other things, changed the name of the districts to resource conservation districts. The newly named RCD's and SCS can now offer total resource assistance to both urban and rural Californians.

Caribbean area: The Virgin Islands Environmental Protection Act was signed into law in 1971; it gives the Virgin Islands conservation districts authority to guide land grading and development on the islands. The Virgin Islands RC&D Project was approved for planning. In Puerto Rico a contract was let for flood control work on La Boquilla unit of the Anasco River watershed, the first construction of this kind ever started in the Caribbean. And the Puerto Rico Environmental Quality Board began referring development plans to conservation districts for review before approval.

Colorado: Cost-sharing of soil survey operations by state, county, and city governments amounted to $39,000 last year and will result in the survey of 334,000 acres that were not on the regular mapping schedule.

Connecticut: SCS developed a Natural Soil Groups System to help present soil survey information in an easily understood form. Soils are grouped by important properties and color coded for easy identification on a map. The system helps local units of government and individual landowners with resource and conservation planning. To date, maps have been prepared for 30 towns or about 500,000 acres.

Delaware: The Cooperative Soil Survey Program for the state was completed in

1971. Delaware now has soil survey data for every acre.

Florida: SCS designed and laid out 69 animal-waste disposal lagoons and gave technical assistance to 15 municipalities in disposing of sewage effluent on the land.

Georgia: The number of earthen raceway systems for raising channel catfish increased to 31 in 1971, and an additional 31 are under construction. These systems have produced up to 60 times the fish yield of a well-managed, comparably sized pond or lake.



Colorado—soil survey

Hawaii: Mounting concern about erosion and sediment problems led to the drafting of new grading ordinances in three of the state's four counties. The ordinances aim at reducing erosion and sediment damage from urbanizing areas. A major requirement makes a plan outlining soil conservation measures a prerequisite to obtaining a grading permit.

Idaho: An isotopic snow gage was established on top of the Mount Baldy snow course at Sun Valley, Idaho. The printout of the snowpack will be prepared by the Aerojet Nuclear Corporation in Idaho Falls under contract with the Atomic Energy Commission and the SCS snow survey office in Boise. Because an isotopic snow gage measures compaction and stratigraphy as well as water content of snow, SCS snow data will for the first time be useful for almost every forecasting purpose including irrigation, power, flood control, pollution control, recreation, skiing, industry, and avalanche hazard forecasting.

Illinois: Minimum tillage gained in acceptance in 1971. Illinois farmers are using some system of conservation tillage on 2 million acres of corn and soybean land. Yields are holding up well, net profits are up, and soil erosion losses are sharply reduced on conservation-tilled or zero-tilled land.

Indiana: RC&D activities on a multicounty basis blossomed in 1971. The active Lincoln Hills RC&D Project continued to make progress; the Historic Hoosier Hills RC&D Project has been authorized for planning. Local committees moved forward on their own in developing area resources; and two other RC&D applications were submitted. The Hoosier Heartland Association of Conservation Districts and the "Four County" Soil and Water Conservation District Resource Area guided multicounty cooperative efforts in resolving environmental problems. Multicounty organizations fostered by conservation districts now comprise 50 percent of the counties and districts in Indiana.



Louisiana—animal-waste lagoons

Iowa: A major erosion-control law was passed in 1971. Soil erosion and resulting sediment can now be declared a nuisance and must be abated after a written complaint is received by a soil conservation district. Landowners may be required to establish permanent or temporary conservation measures on their land on a cost-sharing basis. District commissioners must adopt standards establishing soil loss limits for soils in their district.

Kansas: Application of conservation practices on farmland continued to be the major SCS activity. During 1971, 8,065 miles of terraces and 8,383 miles of grassed waterways were constructed, 684,034 additional acres were farmed on the contour, and 1,770,515 additional acres were placed under crop-residue management. Proper grazing practices were established on 1,557,235 acres.

Kentucky: Because surface mining continued to increase, 39 conservation districts in eastern Kentucky entered into memorandums of understanding with the Kentucky Department of Natural Resources and SCS to provide technical assistance in planning for storage of sediment and debris from future surface-mine operations.

Louisiana: More than 70 animal-waste lagoons were installed in 1971; this reflects the impact that such disposal systems are making on dairymen in the state.

Maine: Several developments in the past year increased the use made of soil information. The Maine Legislature passed several laws based in part on the standard soil survey and soil suitability ratings. The Maine Environmental Improvement Commission now requires that each developer include as part of his application a soil map of the area proposed for development. FHA and several Maine banks indicate that they no longer loan money to individual builders unless the soils at the proposed building site are rated as suitable.

Maryland: Maryland's 1970 Sediment Control Act helped immensely in controlling erosion in urban areas. This law requires that land development plans be referred to soil conservation districts for approval before building or grading permits are issued. The districts utilized the technical assistance of SCS in evaluating such plans. In 1971 all counties, the city of Baltimore, several municipalities, and both private and public agencies developed sediment-control programs through the interdisciplinary task force approach. These programs were in compliance with the standards and specifications for soil erosion and sediment control in urbanizing areas prepared by SCS in Maryland.

Massachusetts: Major effort was directed toward developing criteria for use in evaluating a quality environment. Pilot projects were instituted to determine environmental quality levels. The determination of a given environmental quality level for a given area is based on the available natural resources and their carrying capacity.

Michigan: Fast-developing Otsego County passed the state's first countywide soil erosion and sediment control ordinance. The local soil conservation district helped in developing the regulations and was given development-plan review and approval responsibilities.

Minnesota: The installation of 99 measures to divert uncontaminated runoff around feedlots and collect polluted runoff in a holding pond was a significant accomplishment in 1971. The 99 installations represent a 100 percent increase in this activity over the past year and reflect the growing concern about pollution and animal-waste recycling. To date 158 measures have been installed.

Mississippi: A coordinated program to update the objectives of conservation districts

was completed last year. Fifty-seven district programs were modernized. Not only did this statewide activity strengthen the districts, but also it added new working partners to the conservation program, namely, nearly 1,000 local leaders who helped with the overall planning and who have assumed continuing responsibility for seeing that the updated programs are carried out. In addition, about 30 of the county programs were published in brochure form and circulated to local urban and rural leaders, attracting countywide publicity and attention.

Missouri: In 1971, 137 livestock producers asked SCS for help in planning and designing animal-waste disposal systems. This compares to only half a dozen similar requests in 1970. District conservationists and area engineers have designed 88 of these systems. Of this number, 51 were staked and 35 were completed during 1971.

Montana: Tall wheatgrass barriers on 30-foot spacings were established on more than 4,000 acres of erosive soils in Montana. The practice, which may be applicable to large areas of the Northern Great Plains, reduces soil erosion and conserves moisture.

Nebraska: Animal-waste disposal systems will be mandatory under a new law by December 31, 1972. Consequently, many operators want to put their lots in order before then. SCS, working with the Nebraska Department of Environmental Control, certified more than 1,300 lots as not needing additional waste-control facilities. SCS completed engineering systems for 193 lots. Construction got underway on 96 lots.



Maryland—sediment

Nevada: In 1971, SCS gave technical support through the Central Nevada RC&D Project to the comprehensive planning effort of the Central Nevada Development Authority. The Authority completed an economic base study and resource inventory that incorporates much of the original data and objectives of the RC&D plan. SCS contributed to the study by supplying such information as soils-irrigability maps, an economic evaluation of irrigation potential for each valley, and an economic demand analysis on high-priority water-based project measures.

New Hampshire: To prevent pollution of surface waters and protect water supplies, state laws were amended in 1971 to require all land owners and developers to obtain soil survey data from SCS or equivalent as part of an application for construction of sewage- or waste-disposal systems. SCS answered more than 3,100 requests for such data throughout the state in 1971.

New Jersey: This state took a big step forward in 1971 in its goal of establishing statewide erosion- and sediment-control regulations. A committee organized by the New Jersey Secretary of Agriculture recommended that (1) SCS standards for erosion control, after appropriate revisions, should be adopted by the state, (2) erosion control should be incorporated into the state land-use planning law, and (3) erosion-control ordinances should be enacted by all municipalities.

New Mexico: Minimum loss of soil on millions of acres of New Mexico rangeland was proof of the value of planned grazing systems and range management under the Great Plains Conservation Program during the 1970-71 drought. Oldtimers observed last winter and spring that the loss of topsoil was only a fraction of what it was on the same land during the Dust Bowl months of the 1930's. Climatic conditions were similar if not worse in some areas during 1971, but conservation measures kept erosion under control.

New York: SCS developed a method for inventorying gross soil erosion and computing the sediment delivered to streams and lakes. The Erosion and Sediment Inventory (EASI), sponsored by each of the conservation districts in New York, will be made at the subriver basin level. EASI will include such data as the critical sources of sediment, gross soil erosion by land use in tons, cost of sediment damages, where to find assistance to control



Montana—wheatgrass barriers

erosion and sediment, and the economic benefits of recommended controls. Thirty-five conservation districts are conducting their inventory this winter. The rest of the districts will complete theirs next winter.

North Carolina: The state's 1971 General Assembly was so concerned about natural resources that it has been called "The Environmental Legislature." The assembly passed urban erosion control measures enabling Wake County (suburban Raleigh), Forsyth County (Winston-Salem), and the city of Raleigh to enact local ordinances; created a study group to report back to the 1973 Legislature on statewide legislation in the same field; and passed a mining act that provides for technical assistance from conservation districts in developing and implementing mine-reclamation plans.

The assembly also passed legislation that will reduce about 370 state agencies to about 20 by 1975 and legislation reorganizing the State Soil and Water Conservation Commission. District supervisors replace the director of Extension Service, the state forester, and the director of the Experiment Station on the commission. These, together with the SCS state conservationist, will now serve in an advisory capacity. In October 1971, the Governor established the Department of Economic and Natural Resources, which takes in the Soil and Water Conservation Commission and several other agencies.

North Dakota: The approval for operations of the Lewis and Clark 1805 RC&D Project last January was one of the major conservation accomplishments in North Dakota during 1971. Over and above its value to the more than 4 million-acre area it serves, the project did much to introduce the RC&D concept to the state.

Ohio: SCS in Ohio placed greater emphasis on providing technical assistance to units of government and other decision-making bodies. During the year, SCS assisted about one-third of the slightly more than 3,000 units of government in Ohio. A number of cities passed ordinances requiring a soil and water evaluation where land-use changes are proposed.

Oklahoma: The Oklahoma Legislature broadened the responsibilities and authorities of conservation districts by completely rewriting the State Conservation District Law. Significant changes are: (1) the statement of policy now includes all renewable natural resources; (2) the conservation district now is the primary local unit of government with responsibility for conservation; (3) all qualified voters in a district now are eligible to vote for district directors; (4) counties now have authority to appropriate money for districts from the county general fund; and (5) districts now have authority to prepare and keep current a long-range program for the conservation of all their renewable natural resources.

Oregon: Progress in coordinated resource planning was especially significant during 1971. Under the four-way teamwork of the Forest Service, Bureau of Land Management,

soil conservation districts, and the Soil Conservation Service, the resource program in the ranching areas of Oregon considers all major resources and land uses including grazing, timber, wildlife, and watersheds.

Pennsylvania: The state's Clean Streams Law as amended in 1971 designates sediment as a pollutant, so landowners now may be required to correct pollution-causing situations. Landowners, however, who have applied and maintained conservation plans developed by their conservation district and SCS are to be excluded from the penalties of the law if the pollution results from a natural occurrence.

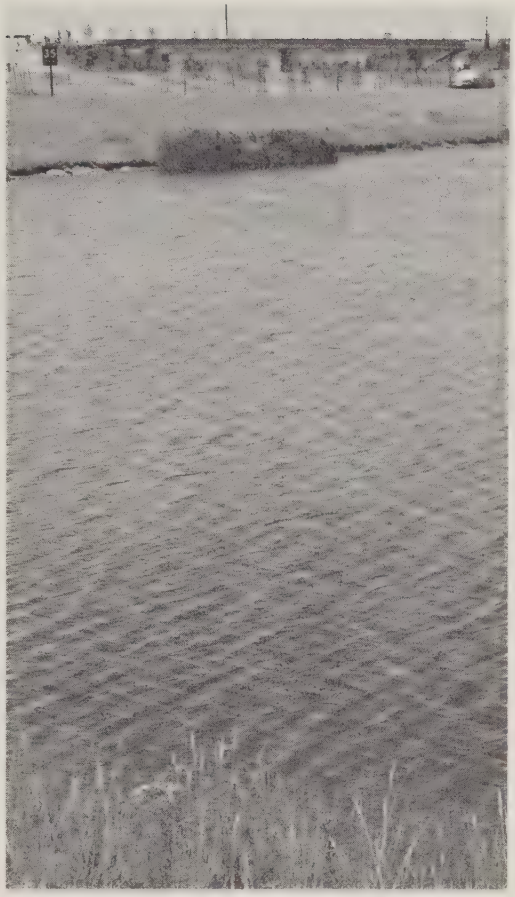
Rhode Island: One of the more unique activities of the past year was the SCS participation in designing a 40-acre outdoor classroom that features a bubbling stream, land ranging from woods to wetlands, and a Cherokee Indian chief as a lecturer. The conservation plan for the South Kingstown classroom includes a 4-acre wildlife marsh, a trail system with lecture stations, and plantings for wildlife.

South Carolina: An act authorizing the governing body of each county to establish a sediment-control program was enacted by the General Assembly and approved by the Governor last April. The act specifically assigns the responsibility for approval of sediment-control plans to the local conservation district.

South Dakota: To provide guidance in the handling, storing, and disposition of animal wastes from confined feeding areas, SCS developed three separate technical standards: for feedlot waste control facilities, for animal-waste lagoons, and for holding tanks for storage of animal wastes. SCS completed the design for 100 waste control systems, 40 of which have been installed.



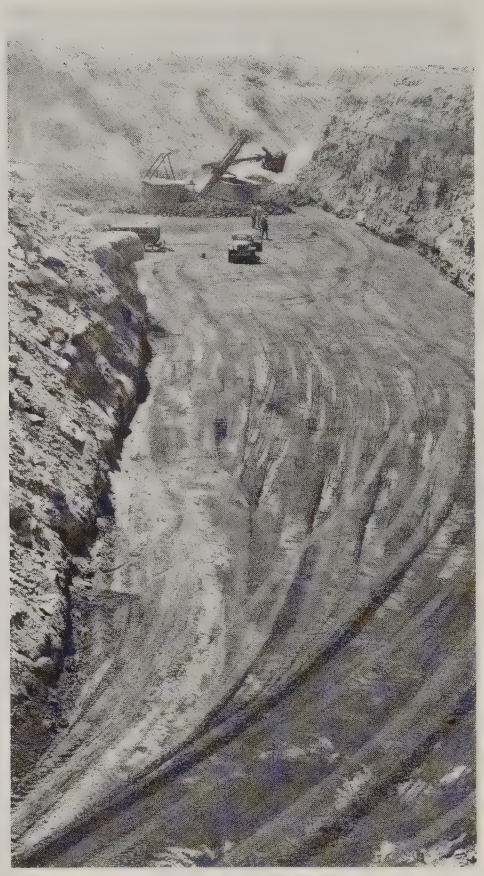
Texas—minimum tillage



Virginia—water

Tennessee: The Chickasaw-Metropolitan Surface Water Management Survey, completed in June 1971, stimulated action by both local and state governments in solving resource problems. Out of this USDA Type IV river basin survey, which takes in a million acres in seven counties in southwest Tennessee and northwest Mississippi, came a watershed work plan for Nonconnah Creek. The $95,000 cost of developing the work plan was financed jointly by the state, the city of Memphis, and Shelby County. Three flood-plain information reports, developed during the survey, were adopted by the Memphis and Shelby County Planning Commission. The Tennessee Legislature passed an act creating the Chickasaw Basin Authority and authorizing nonfederal costs of water-resource projects that are a part of the comprehensive river basin plan to be shared equally by state and local governments. Memphis State University is providing leadership in implementing the basin plan.

Texas: The increase in minimum-tilled acreage was notable. In 1968, no minimum tillage was reported in the state; in 1969, this practice was applied on 1,508 acres; and in 1970, on



West Virginia—surface mines

8,897 acres. Last year, 59,037 acres were minimum tilled. SCS in Texas gave technical assistance to 2,231 units of government in 1971. Inventories and evaluations provided for resource planning increased by 60 percent over last year.

Utah: Planning animal-waste storage facilities was a major conservation activity in 1971. These temporary storage facilities—bunkers for solids and concrete pits for liquids—require approval by the Utah State Department of Agriculture, the Bureau of Environmental Health, Extension Service, Agricultural Stabilization and Conservation Service, and SCS. This multiple approval avoids future problems and costs for the dairyman and feedlot operator. Of the 156 applications for technical assistance received by SCS in 1971, 56 were approved for construction; 39 facilities were completed, and a number of others are under construction.

Vermont: SCS in 1971 was drawn into close cooperation with the newly created Environmental Board and District Environmental Commissions. SCS provides soil data and interpretations and onsite evaluations. The value of the soil survey program to both industrial and residential development has been firmly established.

Virginia: In 1970 the General Assembly authorized the Virginia Soil and Water Conservation Commission to make loans to districts and other legal subdivisions of the state for water-storage facilities for immediate or future use. The first loans under this authority were approved in 1971.

Washington: Many counties established new criteria to determine the value of open space. More and more county officials and planning commissions, working with conservation districts throughout the state, asked for interpretations of soils, plants, and related data to keep up with revisions of county plans. County assessors increased their use of soil surveys and land-capability interpretations in classifying land uniformly.

West Virginia: Preplanning for sediment control in surface mining areas was initiated in 1971. In cooperation with conservation districts, SCS people worked directly with mine operators and Department of Natural Resources inspectors in planning sediment- and erosion-control structures, diversions, waterways, placement of spoil, and establishment of vegetation.

Wisconsin: The Columbia County Soil and Water Conservation District rescued a multimillion dollar beef-feeding operation through the use of soils information. The industry, economically important to the entire county, was about to be closed down by the state's pollution enforcement agency for fouling the waters of the Crawfish River. The SCS work unit at Portage helped to relocate the entire operation on a safer site. To insure that pollution would not occur in the future, a complete animal-waste control system was installed.

Wyoming: A major breakthrough was achieved in 1971 in restoring open-pit mining areas and other disturbed land surfaces. A 1969 state law requires a permit from the Commissioner of Public Lands for each land-surface disturbance. During the past year the commissioner referred all mining companies to conservation districts for SCS recommendations. SCS is working with 10 companies in developing detailed plans for land restoration; three of these companies are carrying out extensive plant-material trials in difficult planting areas. ♦

Review

Books

A Good Life for More People: The Yearbook of Agriculture, 1971. EDITED BY JACK HAYES. *USDA. 391 pp., illus. $3.50.*

The recently published 1971 Yearbook makes a major contribution to the nation's most important debate.

At issue is the shape of the future, and the terms of the debate embrace the questions of national priorities, population growth, technology, and environmental quality.

With 74 percent of the nation now living on 2 percent of the land, it is reasonable for this volume to spotlight the concrete problems and the specific potentials for growth and development in America's rural towns and countryside.

This Yearbook is again a collaborative public-private undertaking. The fusion of viewpoints and the variety of rich data sources are here not only effective but symbolic of the need for national, regional, and local planning to become more comprehensive and more finely tuned to social and natural truths.

The Yearbook is distinguished by the sustained high level of its articles. SCS contributions include articles by Charles E. Kellogg, F. Glennon Loyd, Dirk van der Voet, A. A. Klingebiel, Harold Ryan, Carolyn Johnston, R. C. Barnes, Jr., B. D. Blakely, Eugene C. Buie, R. Neil Lane, and Wallace L. Anderson. Some 25 scholars from American and transatlantic colleges and universities are represented.

The volume, however, is more than a collection of separate pieces. The sensible arrangement of well-planned essays combines to build up and flesh out a national perspective on American planning that is timely and will continue to have merit. Its readers will want to read this volume through.—HOWARD M. GOLDFINGER, *Information Division, SCS, Washington, D.C.*

New publications

How to Build and Save Beaches and Dunes. BY JOHN A. JAGSCHITZ AND ROBERT C. WAKEFIELD. *1971. University of Rhode Island Agr. Expt. Sta. Bull. 408 (Rhode Island Agr. Expt. Sta., Woodward Hall, Univ. of Rhode Island, Kingston, Rhode Island 02881). 12 pp., illus.* Applicable from Maine to North Carolina and along the Great Lakes, presents methods for preserving the shoreline with fencing and beachgrass. Tells how brush, discarded Christmas trees, and snow fences can trap sand for dune building. Recommends American beachgrass as the best grass for sand dune stabilization.

Handbook of Soil Survey Investigations Field Procedures. *1971. USDA Soil Conservation Service. [88] pp., illus.* A guide to the study of soils in the field. It includes observations on the site, gross and detailed morphology, and the mineralogical, chemical, and physical observations and tests that can be done in the field.

Pollution Control Practices for Agriculture. *1971. USDA PA-971. [4] pp, illus.* Explains briefly the U.S. Department of Agriculture's Rural Environmental Assistance Program and how agricultural pollution control costs can be shared.

Factors Affecting the Accumulation of Nitrate in Soil, Water, and Plants. BY FRANK G. VIETS, JR., AND RICHARD H. HAGEMAN. *1971. USDA Agriculture Hbk. 413. 63 pp., illus. $0.65.* Presents the nitrate problem and points out that some environmentalists and ecologists fear that a nitrogen crisis is resulting from use of commercial nitrogen fertilizers and the release of nitrogen oxides by high temperature combustion in power plants and internal combustion engines and that the high nitrate content of many water sources and of some foods, particularly some canned baby foods, is cause for real alarm. The conclusion reached in this handbook from "evaluation of the available information on nitrate in soil, water, foods, and feeds is that the potential for nitrate accumulation does not pose a threat of an environmental crisis. There is no indication of widespread upward trends of nitrate concentrations in foods, feeds, surface or ground water." A comprehensive citation of the literature appears in the handbook.

Trout Ponds for Recreation. BY L. DEAN MARRIAGE, ADREY E. BORELL, AND PAUL M. SCHEFFER. *1971. USDA Farmers' Bull. 2249. 13 pp., illus. $0.15.* This bulletin, superseding Farmers' Bulletin 2154, *Trout in Farm and Ranch Ponds,* contains helpful information for those who are planning to build a trout pond. The only indispensable ingredients are a dependable source of good-quality cold water, soil that holds water without excess seepage, and a location free from the danger of heavy runoff or flooding.

Hydrology. *Rev. 1971. USDA Soil Conservation Service National Engineering Handbook, Sec. 4. [675] pp., illus. $5.75 (Supt. of Documents, Washington, D.C. 20402).* Contains methods and examples for studying the hydrology of watersheds, for solving special hydrologic problems in planning watershed protection and flood prevention projects, for preparing working tools needed to plan or design structures for water use, control, and disposal, and for training personnel newly assigned to activities that include hydrologic studies.

Soil and Water Conservation Activities for Scouts. *1971. USDA PA-978. 30 pp., illus. $0.25.* Supersedes PA-348, *Soil and Water Conservation Activities for Boy Scouts.* Describes 22 soil and water conservation projects to help Scouts understand some conservation principles. Some of the projects are: making soil artificially; determining soil particle size; and finding out how organic matter helps soil structure, how much sediment a stream carries, how capillary water moves through soil, how cover affects soil loss, how mulch prevents soil loss, what contouring does, and how fertilizer affects plant growth.

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Effects of Weed Control and Fertilization on Botanical Composition and Forage Yields of Kentucky Bluegrass Pasture. By Elroy J. Peters and J. F. Stritzke. *1971. USDA Tech. Bull. 1430. 28 pp., illus. $0.20.* Study to evaluate the effects of 2,4-D and mowing, combined with three fertilizer levels, on the botanical composition and desirable forage production of a Kentucky bluegrass pasture.

Regional Variations in Economic Growth and Development With Emphasis on Rural Areas. By Clark Edwards, Robert Coltrane, and Stan Daberkow. *1971. USDA Economic Research Service Agr. Econ. Rpt. 205. 185 pp., illus.* Problems associated with rural economic development, involving maldistributions of population, income, and employment, suggest the need for statistical indicators of rural area growth and development. Four hundred and eighty-nine multicounty trading areas, which include all counties in the 48 contiguous states, were aggregated into five urban-orientation groups. This report gives the findings.

Range Improvement Methods and Environmental Influences in the Northern Great Plains. By Walter R. Houston. *1971. USDA Agricultural Research Service Production Res. Rpt. 130. 13 pp., illus. $0.15.* Reports on a study comparing several treatments and combinations of treatments for range improvement in eastern Montana. The experimental treatments included protection from grazing, seeding, range pitting alone and with seeding of alfalfa and with nitrogen fertilization, and different rates of fertilization.

The Water Encyclopedia. Edited by David K. Todd. *1971. Water Information Center, Manhasset Isle, N.Y. 550 pp. $28.* A practical reference volume containing more than 200,000 facts about climate, hydrology, surface- and ground-water resources, water use, water needs, and water quality. Also contains a directory of water resource agencies.

The Water We Live By—How To Manage It Wisely. By L. A. Heindl. *1971. Coward-McCann, 200 Madison Ave., New York, N.Y. 127 pp. $4.29.* Outlines some basic principles for the sound management of water resources. Gives numerous examples of difficulties and catastrophies that can result if these principles are ignored. Discerning enough so young readers are shown the interlocking problems involved in water management.

Meetings

January

12-13 National Council of Farmer Cooperatives, Phoenix, Ariz.
19-22 American National Cattlemen's Association, Denver, Colo.
20-22 National Woolgrowers Association, Phoenix, Ariz.
23-27 National Association of Home Builders, Houston, Tex.

February

3-5 Catfish Farmers of America—Fourth Annual Convention and Trade Show, Dallas, Tex.
5-7 Water Resources Congress, St. Louis, Mo.
6-11 Society for Range Management, Washington, D. C.
12-16 American Association of School Administrators, Atlantic City, N. J.
13-17 National Association of Conservation Districts, Washington, D. C.
16-18 Land Improvement Contractors of America, Phoenix, Ariz.
27-29 Sprinkler Irrigation Association, Annual Technical Conference, Denver, Colo.
28-March 2 National Farmers Union, Houston, Tex.

March

3-9 Associated General Contractors of America, Houston, Tex.
5-8 Association for Supervision and Curriculum Development, Philadelphia, Pa.
5-9 Society of Toxicology, Williamsburg, Va.
8-11 American Camping Association, New York, N. Y.
10-12 National Wildlife Federation, Mexico City, Mexico.
12-15 The Wildlife Society, Mexico City, Mexico.
12-15 North American Wildlife and Natural Resources Conference Mexico City, Mexico.
12-18 National Wildlife Week.
25-27 Western Audubon Conference, National Audubon Society, Asiloman Beach State Park, Calif.
25-29 American Pulpwood Association, Atlanta, Ga.

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SOIL conservation

U.S. Department of Agriculture/Soil Conservation Service/ February 1972

SOIL conservation

February 1972, Vol. 37, No. 7

The weather may be frightful, but the work of the Soil Conservation Service—like that of your friendly postman—must go on. This month, SOIL CONSERVATION looks at the winter faces of soil and water conservation. SCS's snow survey program continues to grow in importance in the West, and now there's an isotopic snow gage (lead article) that promises to streamline forecasting. The centerspread illustrates how useful snow survey data can be to architects and builders. And several articles point out how the summer efforts of SCS people contribute to our winter fun.

Departing from the winter scene, Don Dudley, assistant director of the Oklahoma Conservation Commission, reports how landowners, by pulling back their fences to widen the right-of-way on rural roads, helped to control sediment pollution.

COVER: This scene along the Little Wood River near Ketchum, Idaho, reflects the serenity and beauty that a winter day can bring. Photo is by Bob Branstead, Washington, D. C.

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Understanding our resources

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

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Double-barreled snow gage

by Vincent J. Price
Information Division, SCS
Washington, D.C.

Two-thirds of the surface of the earth is covered by water. Everyone knows that. But how many people know that of the remaining surface one-third is covered by ice and snow? Man now knows a good deal about the ocean: oceanographers, hydrographers, and marine biologists have done much toward explaining the mysteries of the sea. Much less is known about the mysteries of snow.

"Some of the most disastrous floods in the United States have been attributed to too rapid melt of snowpacks or to rain falling on and melting snowpacks," reports Dr. James L. Smith, a hydrologist with the USDA Forest Service. "In California, 51 percent of all streamflow comes from melted snow.

"As man intensifies his activities on the flood plains of rivers, improved warning systems are needed that will permit more time to evacuate people from the flood zone."

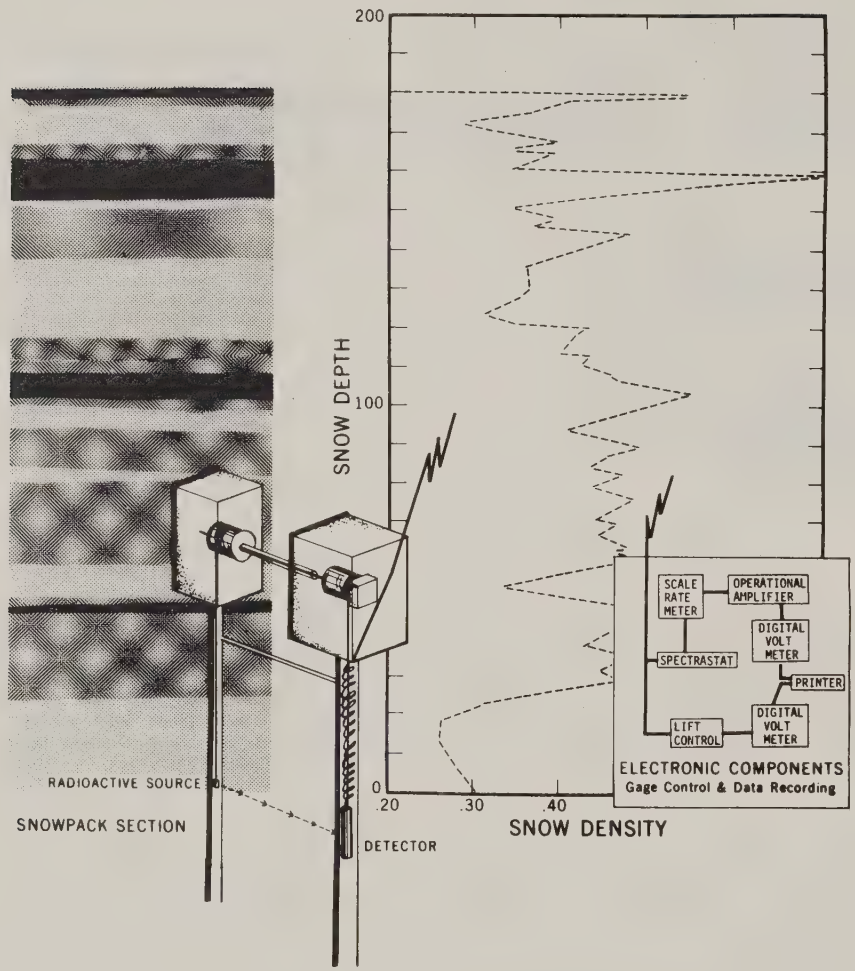
Morley Nelson, SCS snow survey supervisor in Idaho (now retired), agrees: "It has been estimated that the total value of water and its management in the Columbia Basin alone is worth more than $1.4 billion per year. The management of this resource varies directly with the quality and timeliness of the data pertaining to it."

For more than 30 years the Soil Conservation Service has provided water forecasts based on snow surveys taken in the mountains. Manes Barton, head of SCS's Water Forecasting Unit at Portland, Oregon, reports that today "the present network, excluding California where snow surveys are conducted by the California Department of Water Resources but including Alaska, consists of 1,450 snow courses, 200 aerial markers, 200 soil moisture installations, and 300 precipitation gages."

But this network and standard snow surveying methods are hardly perfect. For example, Dr. Smith explains that in hand sampling, a hollow tube is driven into the snowpack; it is extracted and the column of snow within the tube is weighed. Knowing the length of the snow sample and its weight, a snow surveyor can compute water content and density with an error of ± 7 to ± 12.

Furthermore, as Manes Barton points out, only the average density of the entire snowpack is obtained by the manual systems. The pack could be "snowball snow" throughout, or it could be hard as a rock on the bottom and only fluff on top. With standard snow surveying techniques, there's no way to tell.

ISOTOPIC SNOW GAGE



The density of the snowpack between the radioactive source and the detector will print out as shown.

Now, however, there is a way to tell. A new snow gage, based on an isotopic source and a gamma-ray detector, can give a clear picture of the stratigraphy—the strata structure—of snowpacks. Devised by Dr. Smith and installed through a cooperative effort between the Atomic Energy Commission and the Idaho Nuclear Energy Commission, the isotopic snow gage is, as Morley Nelson says, "the only measuring device that gives us the stratigraphy of the snowpack, its depth, and its water content in accurate reproducible form."

Although commonly called the isotopic snow gage, it would be more correct to call Dr. Smith's invention a profiling snow gage. (It could also correctly be called a thermo-electric gamma-attenuation profiling snow gage, but most folks around Sun Valley, Idaho, think that that's a little heavy handed.) Isotopes are already being used to decrease the hazards and difficulty of manual surveying. The Atomic Energy Commission's Oscar M. Bizzell explains that there is "a fly-over system that measures gamma-ray attenuation from a radioisotope source located at ground level under the snowpack. This eliminates the need for ground-level mechanical and electronic equipment in remote and inaccessible sampling sites. Except for the cesium-137 radioisotope on the ground, all the measuring equipment is in a fixed wing aircraft that can quickly fly from one gaging site to another and rapidly measure the snow water at each location."

The Soil Conservation Service in Montana is cooperating in this work and has installed units near Bozeman for study.

The fly-over gage gives information on snow-water content only—it does not tell anything about the condition within the snowpack. And that condition, or stratigraphy, determines how much water runs off, and when.

The AEC, therefore, also funded the profiling snow gage. "The engineering for the snow gage was done by the Aerojet Nuclear Company and was funded by the Division of Isotopes Development of the AEC," explains ANC's Dr. Peter Randolph. Aerojet Nuclear Company is the operating contractor for the National Reactor Testing Station.

The first isotopic-profiling link in the SCS snow survey network is the gage set up on Mt. Baldy in Sun Valley, Idaho. "From the standpoint of mountain snow cover, our Mt. Baldy snow course is a representative area," explains Morley Nelson. "Here within 100 yards there are high winds and many other variables."

A gage has also been set up at Donners Pass in California. That gage is a research instrument reporting to Dr. Smith's office at the University of California at Berkeley. It consists of four parts: the field unit (which does the actual measuring), the base station, a power supply, and a data transmission system (a system to communicate data and commands between the field unit and the base station).

The field unit consists of two access tubes, one containing a radioactive source and the other containing a detector. A lift mechanism, very much like two modified fishing reels, raises and lowers both the ra-

dioactive source and the detector so they are equidistant from each other down the entire length of the access tubes. The detector registers the number of gamma rays reaching it, which depends on how thick the snow is between the source tube and the detector tube. By raising or lowering the source and detector, a profile of the snowpack can be made in increments of ½ to 1 inch.

One of the more interesting engineering problems facing ANC was which isotope to use. "We examined several possibilities for radioactive sources," reports Dr. Randolph. "We concluded that 10 millicurries of cesium-137, as used by Dr. Smith, was just about optimum. This source has a single gamma ray of 662 kilovolts, a 30-year lifetime, and is rather inexpensive."

The base station has almost as many functions to perform as the field unit. It must receive and process data; it must transmit commands; and it should have the capability of running several stations rather than just one. The Mt. Baldy gage has two base stations: the printout is prepared both by the ANC at Idaho Falls and by the SCS snow survey supervisor's office in Boise.

"The most difficult aspect of the design was the data transmission system," reports Dr. Randolph. "The basic requirements for such a system are that it function reliably with minimal maintenance and that it preserve the information that is sent over it without introducing any spurious effects. The usual systems involve radio transmission (telemetry), or some kind of telephone linkage, or a combination of both. Our difficulty was that the snow gage operates so slowly that it would be inefficient to telemeter data across a radio network as the gage took its readings. ANC had to design a device that would prepare the data for transmission to the base station. This year they are using a leased telephone line with data phone, computer, and teletype for transmitting data."

Future installations will utilize telemetry for transmitting data. There are several radiotelemetry networks already, and most isotopic snow gages should be near enough to "hook up" with one.

The easiest aspect of the design was the power supply. Commercial power is usually not available on the remote mountain courses where a snow gage would likely be located. There is some debate as to which of two substitute charging devices is better: a thermo-electric generator or solar panels. But on Mt. Baldy, the snow gage is simply plugged into the nearest electrical socket—that being the Sun Valley ski lift.

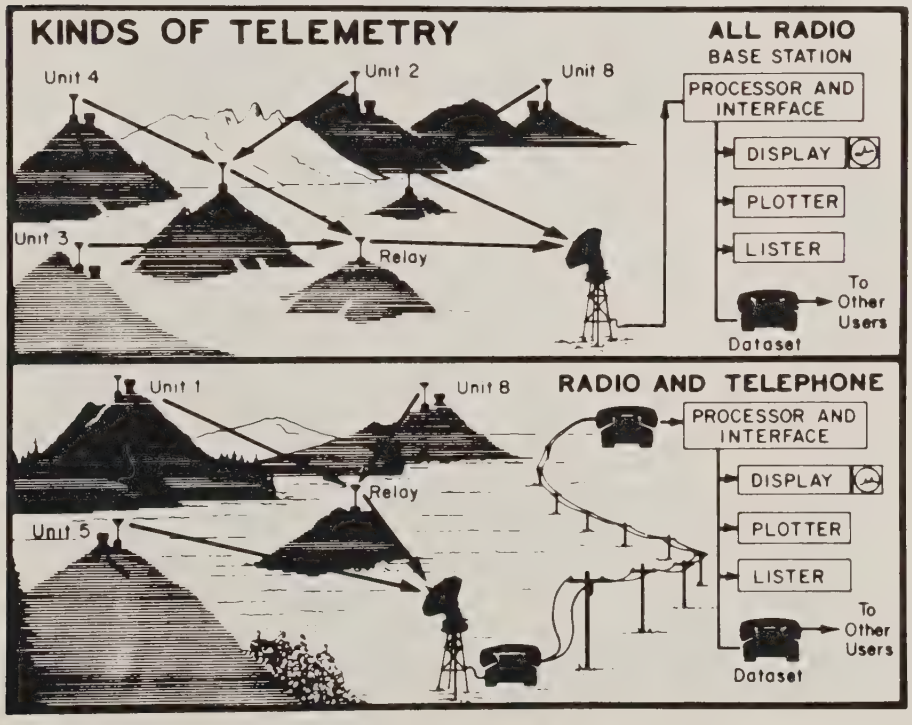
The agencies involved hoped that the Mt. Baldy snow gage would be ready for the winter of 1971-72, and they made it. The first profile was taken on November 24, and the gage has been reporting on command since then.

The gage holds promise to anyone concerned with water resources. Jack Wilson, the current SCS snow survey supervisor in Idaho, suggests that these data are useful in forecasting water runoff for irrigation, power, flood control, pollution control, recreation, industry, and fish and wildlife and in forecasting avalanche hazard.

Winter recreation has benefited from in-depth reports on the condition of the pack; these reports aid Sun Valley skiers and snowmobilers alike.

"The use of data from the profiling snow gage opens a new dimension to streamflow forecasting," says Dr. Smith. "More accurate streamflow predictions from snowmelt could result in better scheduling of reservoir operations and in less 'reservoir spillage.' In some flood situations, such prior knowledge could conceivably save lives."

Perhaps the most eloquent expression of appreciation came from Morley Nelson, who summed up that first November 24 printout with, "Beautiful, magnificent piece of data!" ♦



In the future, snow data will be telemetered via radio or a combination of radio and telephone.



Conservation on the ski slopes

by Ford Allen
District conservationist, SCS
Gaylord, Michigan

Conservation is what everyone talks about these days. Hidden Valley does something about it.

Hidden Valley is a membership club in Michigan's north country. It was founded in the mid-1930's by Don McLouth, a conscientious conservationist who wanted a place where he and his friends could come and enjoy the beauty of the undisturbed north country. Until the late 1940's, the only structure on the site was a warming hut, east of Gaylord, where the present club house is located.

Major construction began in 1947. Lodges and sleeping quarters were built, and later a complete summer recreation program was established. It included golf, swimming, tennis, hunting, boating, and nature trails. Skiing and ski touring were added recently.

In making the ski slopes, the club found they had unknowingly caused an erosion problem. Until then, little erosion had taken place. The ski slopes had been cleared of vegeta-

(Above) A 2,000-foot ski slope covered with creeping red fescue, Kentucky-31 fescue, domestic rye grass, and timothy. Sediment from ski slopes near Gaylord, Michigan, had been choking the headwaters of the Sturgeon River before conservation measures were applied.
(Right, top) The grounds around the two desilting basins built at Hidden Valley to stop the flow of sediment into the Sturgeon River.
(Right, bottom) One of the desilting basins built on streams that originate on the Hidden Valley property. Note the silt fan at the entrance to the basin (in the background) and the clearness of the water (in the foreground) flowing over the gravel bottom as it leaves the basin for the Sturgeon River.





tion during the summer, and after a winter of skiing, the spring rains came and severely eroded the slopes. The sediment that washed down choked the headwaters of the Sturgeon River.

The club went to the Otsego County Soil Conservation District and the Soil Conservation Service for help. A resource plan was prepared; it included several conservation practices to control soil erosion and sediment and, at the same time, promote esthetics.

The slope that was causing most of the sediment problem is 2,000 feet long and has 280 feet of fall. There are several springs on the slope.

The first step was to design and install a water-disposal system. Then the slope was graded and smoothed for skiing. After that, a seedbed was prepared and fertilizer was applied. Creeping red fescue, Kentucky-31 fescue, timothy, and domestic ryegrass were seeded, and a hay mulch was applied.

The resource plan called for the installation of two desilting basins for the two streams that drained the ski area. Within 10 days after the ground was broken, the basins were completed, the banks were sodded, and the spoil area was seeded and mulched.

Michael Debelack, the club manager, was very pleased with the way the desilting basins removed sediment from the streams during and after rainstorms. Says he, "The basins do an excellent job of trapping the sediment."

Debelack and his foreman, Neil Smith, did not stop with the basins. They went ahead seeding, fertilizing, and mulching eroded areas, roadsides, ditches, and ditchbanks. Where the ditches were too steep to seed, they lined the ditch bottoms with cobblestones.

The membership of Hidden Valley, like everyone else in Otsego County, is concerned about preserving the beauty of Michigan's north country. And they are doing something about it. ♦

Grass — a friendly base for ski fun

by Ralph H. Felker
Area conservationist, SCS
Provo, Utah



Skiers on the slopes at Utah's Park City Resort, east of Salt Lake City, know little of the preparation and work that went into getting the course into its present splendid condition.

They glide and swoop over the heavy white mantle of snow made more firm and lasting by the insulating effect of the thick grass cover underneath.

A. W. (Woody) Anderson, manager of the resort, says that a snow course is in some ways like a house. "It must have a good foundation," he explains. An avowed conservationist, Anderson is aware of the need for plant cover for protection of the land in most of its uses.

Park City has nearly 35 miles of skiing slopes between the 7,000- and 9,400-foot elevations. Seven lifts accommodate skiers at the rate of 7,000 an hour.

The planning of Park City began in 1962. Professional ski-run designers helped with the overall layout.

For help in developing a long-range plan for the entire 12,000 acres of range and forest land, Anderson went to the Kamas Valley Soil Conservation District. He explained to the district supervisors that he had in mind sheep grazing, improved wildlife management, watershed conservation, and an 18-hole golf course in addition to the ski enterprise.

SCS people assigned to the district were ready to help with the conservation work. DeWitt Grandy, a range conservationist, proposed trial field plantings of six varieties of grass. Seed for four varieties—Tegmar intermediate wheatgrass, Pomar orchardgrass, Durar hard fescue, and Sodar wheatgrass—was provided by the SCS Plant Materials Center at Aberdeen, Idaho, because it was not available at the time from commercial sources. Smooth brome and the intermediate wheatgrass seemed to fit the need best.

In 1963 clearing began.

"That was when I got scared," Anderson admitted. "I could see a heavy rainstorm turning the runs into rough, rugged gullies."

By the time the course was ready for use, the grass was doing its job.

In mid-August each year the grass and aspen sprouts are clipped about 8 inches from the ground. The clippings are left on the ground, thus helping to reduce soil loss and to improve water percolation into the soil. They also add to the insulating effect.

"Where the clippings have accumulated, we have an earlier snowpack and earlier skiing," Anderson explained.

Fire is a continuing threat, especially in August and early in September. The Utah Department of Forestry has worked with Park City Resort on a fire control plan.

The skiing season lasts about 150 days, from mid-November to late April. But there is activity before and after. Deer habitat has improved; visitors riding the gondola lift frequently see deer on the slopes below. Sheep graze certain areas in summer. The entire watershed is protected by improving the vegetation, which keeps water pollution by sediment at a minimum. The 18-hole golf course will be playable next summer.

In winter Anderson and his staff keep a watchful eye on the places where accidents occur. These locations are studied, and the terrain is changed sometimes to reduce the hazard. Disturbed areas are seeded promptly to prevent erosion and to provide the grass base for snow.

There is still work to be done to make the course more efficient, claims Anderson. One objective is to install an electronic snow measuring device to get prompt and accurate information on snow conditions. The Kamas Valley Soil Conservation District is helping with this. The U.S. Weather Bureau has installed a station on the upper part of the complex. With the measuring device to report snow conditions on a moment's notice and the Weather Bureau station to provide forecast information, the Park City





(Above) The tall, thick-growing grass on this ski slope at Utah's Park City Resort was clipped to an 8-inch height before the skiing season began. (Left) Slopes are readied in August and September. The mowed grass and clipped shrubs are left on the ground. They make an ideal base for the coming snows. (Opposite page) Woody Anderson, manager of the Park City Resort, inspects the grass cover on one of the slopes.

staff will be able to keep skiers fully informed.

About 21 percent of the winter days in the area are overcast and snowy, but 55 percent are sunny with day temperatures averaging 20 to 30 degrees. With plenty of snow on the slopes, skiers couldn't ask for anything more. ♦

Mountain maker

by Gerald E. Malone
District conservationist, SCS
Saginaw, Michigan

A do-it-yourself ski mountain is not easy to build, especially when what you have to start with is flatland.

John Bintz had a 200-acre fruit- and cash-crop farm near the tri-city area of Saginaw, Bay City, and Midland, Michigan, but he was determined to build a ski mountain.

Bintz' mountain making started late in 1960 shortly after he bought a tractor. By the time he had mastered its operation and the technique of moving earth, the mountain was on its way up. But winter set in and the ground froze, so Bintz had to wait for spring.

When spring arrived the ground thawed and the rains began. Man and machine were spending as much time getting out of the mud as they were building. But Bintz didn't give up. By the end of summer he had a 30-foot hill. For the next 3 years, his equipment operated almost continuously building the hill to its present 160-foot height. Bintz claims that his mountain, which he calls Apple Mountain, is the highest manmade mountain in the United States.

Bintz explained that enlarging Apple Mountain over a period of years created an erosion problem, so when he finished the mountain, he began a program of seeding. As a longtime cooperator of the Saginaw Soil Conservation District, he requested their assistance.

There is a depression at the bottom of the hill that serves as a sediment basin. Consequently, there was no damage to surrounding land or buildings from the erosion.

The front of the hill was seeded, mulched, and fertilized in the spring of 1971. Bintz buys 1,000 or more trees every year from the conservation district and has established a windbreak of white pine and spruce adjoining the hill. Trees are planted annually to control erosion and to beautify the area. The trees are doing well, but it takes a long time to grow an effective windbreak, so Bintz is now planting larger trees hoping to reduce this time.

The ski mountain, thought of as a way to utilize local labor the year round, is in an area that has virtually no natural slopes for winter recrea-





tion. Bintz has equipped Apple Mountain with eight rope tows, snow making machinery, and a large lodge. In addition to the skiing operation, he has a steak house, ski shop, cider mill, and gift shop—and he still has his apple orchard and cash-crop farm. Bintz employs more than 150 people. About 450,000 people are within 30 minutes driving distance from Apple Mountain.

Making mountains can be fun—and profitable. Already Bintz has a second one under construction. ♦

(Above) A manmade mountain used for skiing. The depression at the foot of the mountain serves as a sediment-catching basin. (Left) John Bintz, extreme right, talks to a group of Michigan State University students before showing them the Apple Mountain complex. Many college students and several thousand school-children tour the Bintz operation every year.

a weight pr





In the West, houses and other buildings in the mountains must be designed to support the

In the West, as man chooses to live farther and farther into the mountains, the need for snowpack information becomes imperative. Planners, architects, and builders need to know the weight of the snow expected on a roof.

A year ago the Tahoe Regional Planning Agency asked the Soil Conservation Service for this kind of information about the snowpack in the Lake Tahoe Basin.

It was on the slopes of Mount Rose overlooking Lake Tahoe that Dr. James E. Church, a professor at the University of Nevada and an enthusiast for winter mountaineering, began his study of the mountain snowpack in 1904. He developed snow measuring equipment and established permanent snow sampling sites. That was the beginning of the modern science of snow surveying.

By 1909 the value of this new science for streamflow forecasting and water management was recognized. Regularly scheduled surveys started. Today, surveys are carried on throughout the Western States by the Soil Conservation Service and its cooperators.

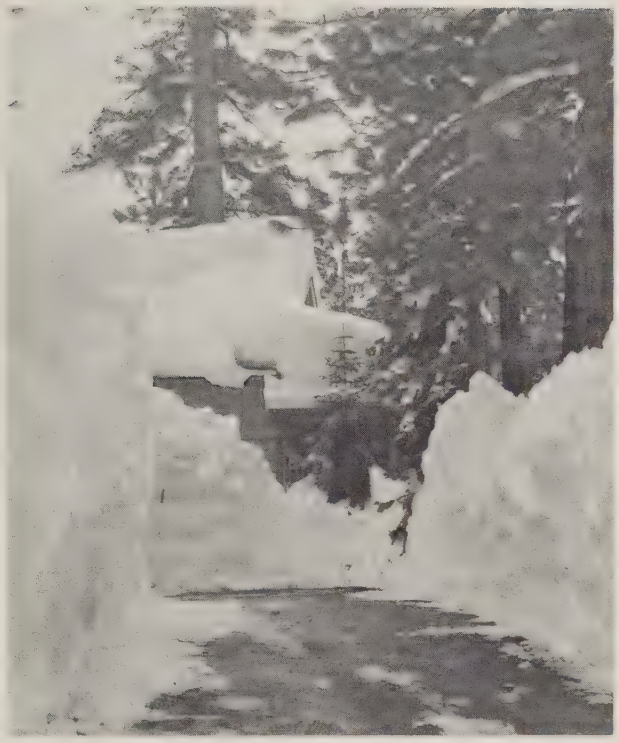
Yearly snowfall within the Lake Tahoe Basin varies greatly because of elevation and other factors. The snowpack in one of the highly developed areas varies from 16 to 220 inches.

Information from the original snow courses on Mount Rose was among that analyzed to help with snow problems in the basin. SCS snow surveyors marked off eight zones on a map. Snow loads in the zones ranged from 140 to 420 pounds per square foot.

With this information, designers now can provide safety features so that structures will not fail under the heavy loads that build up in winter in the Sierra Nevada. This

oblem

by Donald W. McAndrew
Snow survey supervisor, SCS
Reno, Nevada



eight of the winter snow accumulation.



—this summer cabin was not.



information is also important to recreation planners and to the operators of ski courses in the Tahoe area.

These and other uses of snowpack information—managing and planning water resources for irrigation, power, and municipal use and warning of possible floods—have developed over the years from Dr. Church's original studies on the snow-mantled peak in Nevada. ♦

The Lake Tahoe Basin covered with the winter's snowpack. Depth of snow typically ranges from 16 to more than 200 inches.

Are conservation districts fenced in?

by Don Dudley
Assistant director
Oklahoma Conservation Commission
Oklahoma City, Oklahoma

"Insufficient rural road right-of-way makes it difficult to shape roadside ditches and to sod a protective grass cover," reports W. A. Juedeman, chairman of the Oklahoma Conservation Commission. "As a result unsightly, dangerous gullies are formed, and these carry sediment to our lakes and streams."

Oklahoma conservation districts have begun to do something about this roadside problem. A prime example of present efforts is the work being done through the Coal County Conservation District Rural Road Improvement Pilot Project.

This project—a cooperative effort between the district, its landowner-cooperators, and county commissioner Sam Nelson of the third district—carries conservation work beyond the fences, so to speak, to the roadside to control roadway sediment pollution. The landowners have moved their fences back, widening the right-of-way and allowing sufficient room for the commissioner to prepare the roadbed and shape drainage ditches.

"Rural road rights-of-way usually are not wide enough to properly construct roads," says Nelson. "A minimum of 70 feet is needed for the roadbed, shoulders, and drainage ditches. If you don't have sufficient space, runoff will cause washing problems, and very little is gained by surfacing the road. But if landowners move their fences back to provide an adequate right-of-way, the roadbed, shoulders, and drainage ditch can be properly designed, and the road surfaced to give years of good use."

Properly designed surfaced roads are safer and cost less to maintain then unpaved roads; they help control sediment pollution, reduce expensive wear on vehicles, add to the beauty of the countryside, increase land values, and help provide a better environment.

Robert Brashears, chairman of the Coal County Conservation District, says that a 2-mile strip of road near Pleasant Hill was selected to get the project underway. Landowners on each side of the road moved their fences back about 10 feet. The Soil Conservation Service gave technical help in designing the drainage area and in establishing a protective grass cover. And the county commissioners had the road designed and surfaced.

Norbie Romines, Ed Harmon, and Jack Kieffer, three landowners living along the road, say that the new road is well worth a few feet of land given up for right-of-way. They and their neighbors are out of the dust and mud, and the appearance of the area has greatly improved.

There are more than 86,025 miles of unsurfaced roads in Oklahoma; this amounts to approximately 518,724 acres of unprotected sediment-polluting land. Unsurfaced roads are not protected from the forces of wind and water and therefore are subject to critical erosion. In some areas of Oklahoma it is estimated that as much as 100 tons of soil are lost per mile of road.

Conservation districts in Oklahoma are charged by state law as the local unit of government responsible for conserving natural resources. One of the biggest problems is erosion, which comes in many forms. And one of the major sources of sediment pollution is erosion on unsurfaced roads and roadside ditches.

County commissioners report that county funds are inadequate for surfacing rural roads and that federal projects set matching fund requirements too high. It is hoped that by reducing these requirements adequate roads can be built to service rural areas. ♦

Willing to serve

by John M. Cross
Information specialist, SCS
Lincoln, Nebraska

When David Landis graduated from law school last December, the Lancaster County Soil and Water Conservation District in Nebraska immediately had its own built-in lawyer. Landis, who is 23 years old, was elected to the district board while still a law student. He was interested and wanted to serve.

His interest in conservation came from a research paper he did as a college freshmen for a political science class. The paper, "Trans-Basin Diversion of Water," took him into state statutes, led him to the Nebraska Soil and Water Conservation Commission, and finally to local soil conservation districts. After studying the qualifications for district supervisors, the ways to get elected, and how to win, he decided to run for office, and he won. At 22, he was the youngest elected public servant in the state.

To enter the race for district supervisor in Nebraska a candidate must have 10 names on a petition. Landis got eight quickly—his law professors. But his father, Frank Landis, also an attorney and an insurance corporation executive, was opposed to his entry. The senior Landis wasn't sure his "boy" was ready to enter "politics." Eventually, however, he went along with the law professors and signed the petition. Later he laid claim to getting his son elected.

Supervisor David Landis brings to the Lancaster Soil and Water Conservation District Board a freshness of youth combined with wisdom far beyond his years, according to other members of the board who had had some discouraging experiences with young supervisors in the past. Landis has put together an interest in ecology, a knowledge of the law, and a willingness to work.

"We were wondering what we had here," said Owen Perry, chairman of the board. "What we have in Dave is a man willing to listen and learn, and one who gives careful thought to every issue. We older fellows recognize the gap between generations, but Dave fills that gap for us. We see him as a link with the university and young people, one who will let them know what districts have been trying to do for the past 30 years." Perry has served on the board for 21 years; Harvey Ehlers, 20 years; Fred Retzlaff, 4 years; and Bernard Sullivan, 6 years. All are past 40 years of age.

"So many of my generation want leadership positions without working for them," admits young Landis. "I consider my job a way of serving the public—doing the things my generation should do—and I am willing to work for the opportunity.

"Law is a tool for public service as well as for personal gain," says the young lawyer. "I've committed myself to the study of law and thereby have committed myself to serving the public."

Landis wants to continue to live in Lancaster County and continue to serve the soil conservation district. ♦



David Landis, on the left, at 23 is the youngest member of the Lancaster County Soil and Water Conservation District Board of Supervisors. He is shown here with Val Bohaty, SCS district conservationist, in the center, and Owen Perry, district board chairman, on the right.

conservation in action

Instant answers

When do you solve today's problems? Today? Tomorrow? Next week? In a year? Efficiency in solving problems is not equated with fast action alone. Efficiency means doing the *right* thing fast, and usually that takes some doing.

That's what computers are all about—speed *and* accuracy.

These qualities—the computer's virtues—are especially important in conservation. The conservationist has to balance a variety of considerations and come to the best possible alternative; if he deliberates too long, the object of his deliberation may wind up headed down the river or blowing in the wind.

With a properly designed computer system, a resource conservationist or RC&D project coordinator can have at his fingertips much of the information he needs to help him make the right decision fast.

SCS has implemented such a system, a data retrieval system that can accelerate the SCS program and open new dimensions in the manipulation and refinement of data.

The principles behind the Map Information Assembly and Display System are not new. The data to be stored are first represented in some form on a map or grid and then stored symbolically in the computer in such a way that the position of the data on the map is maintained. Once the appropriate "maps" are stored, numerous combinations can be made to satisfy the needs of the user. For example, from river basin maps showing county boundaries, ownership, land use, and soil type, a user could request a new map showing location and area of privately owned land in "X" county that had a severe flood hazard.

The number of combinations that can be made to meet a need is limited only by the amount of data available as base maps. Although computer processing costs are modest, considerable amounts of personnel time are required to tabulate the data for entry into the computer.

Presently, a system is being developed to solve this problem of data entry—the Advanced Mapping System (AMS). Initially designed to automate the preparation of soils maps for published soil surveys, the system will include high-speed scanning devices that will digitize data from aerial photographs or maps and store the data on magnetic tape. When the system is fully implemented, any kind of data can be taken off the maps and processed for combinations and interpretations. AMS not only will solve the time-consuming task of tabulating the data, but also it will store the data in much greater detail than would be practical with manual tabulation. This increased detail will make more refined analyses possible.

These data files developed as part of the Advanced Mapping System will be a part of the system of integrated data bases used to support the Service's Management Information System (MIS). An integrated data base is a data file structured so that information used in common by various users can be stored and retrieved for evaluation, processing, and display. Plant scientists can make direct use of stored soils data, soil scientists can use river basins data, and so on.

Although the overall design of the MIS has not been started, work is underway on some of the data bases that have been identified as being part of the system. These include cartographic soil data, soil classification, and pedon data in the soil data system; site-index data in the woodland data system; plant name data in the range data system; and the Conservation Needs Inventory.

Most of the data bases being developed will store various types of natural resource data; their principal use will be in support of the operational activities of the Service. SCS scientists, coordinators, and conservationists, as well as other planners and decision-makers working with SCS, will have access to a computer data base that provides the information they need when they need it. Further, they will be able to utilize sophisticated modeling and simulation techniques to test the effects of a decision in advance.

But then, that's what computers are all about—speed *and* accuracy, and a way to solve tomorrow's problems today.—ROBERT E. MACLAY, *Management Division, SCS, Washington, D.C.* ♦

SCS helps the short and the tall

There's a "gentle giant" in Jackson Hole, Wyoming. That's what skiers in this area call Rendezvous Peak, the highest ski mountain in North America.

Skiers and sightseers get to the top of the giant, 10,446 feet above sea level, by means of a 63-passen-

ger aerial tram that rises 4,135 feet from Teton Village on the valley floor.

In April 1969, the Jackson Hole Ski Corporation, through the local conservation district, asked the SCS office in Jackson for technical assistance in reseeding several new ski runs on the mountain. That fall, after the runs were cleared, a mixture of hard fescue and dwarf intermediate wheatgrass was seeded and has since proved to be well adapted to the steep, rocky sites.

Sometimes, even a giant needs a helping hand.—DOUGLAS E. PAYNTER, *district conservationist, SCS, Jackson, Wyo.* ♦

One town's efforts

The town of Piermont, New Hampshire, population 445, is an excellent example of what a concerned small town with limited financial resources can do to improve its present and future environment.

Located in the beautiful upper Connecticut River Valley, Piermont is primarily a farming community with dairy cattle outnumbering the resident population many times over. The seasonal home boom, however, and the recreation-bent populance from the large urban areas of southern New England are fast changing the people-cow ratio. A recreation complex is planned for one section of town, and second homes are appearing in the mountains and around lakes and ponds.

In 1968, realizing that these new land uses were rapidly moving up the valley to Piermont, the town planning board developed a comprehensive plan with federal, state, local, and private sources providing information and technical help.

To help implement the plan, the town turned to the Grafton County Conservation District and through them has utilized Soil Conservation Service personnel and the North Country Resource Conservation and Development Project's available resources.

The first efforts were directed towards fire protection for the town. A wetlands conservation inventory conducted by SCS identified 13 sites where water could be stored for many purposes including fire protection. The town shared costs with individual landowners in developing these sites. Dry hydrants purchased through the conservation district were also cost-shared and installed at six of the sites.

Next, a land-use ordinance based on soil information was developed and approved by the voters.

Selectmen and the school board have requested help from the North Country RC&D Project in developing an outdoor classroom on 150 acres of town land adjacent to the elementary school.

Many other projects and requests for assistance ranging from information on critical area stabilization to soil and water conservation facts relating to homesite location remind town officials that good conservation is a constant day-to-day concern.

The town has relied heavily on federal and state agencies for technical assistance, but local people including town selectmen, the planning board, fire department, and civic groups have furnished the impetus to plan and implement the measures necessary to guarantee a quality environment for Piermont.—W. MICHAEL DANNEHY, *district conservationist, SCS, Woodsville, N. H.* ♦

Ecology scholars

A nine-session ecology course entitled "Seminar on Natural Resources and Environment" was included in last semester's adult education program at Northeastern Nebraska College in Norfolk. One or two college students enrolled, but primarily the participants were local people long out of school.

Classes covered such topics as "Soil, the Basic Resource;" "Water, Life's Necessity;" and "Grass, Nature's Healer." These were conducted by area Soil Conservation Service employees on their own time.

University of Nebraska Extension Forester Dick Gavit taught the session, "Forests, a Resource or a Product?" And representatives of the Nebraska Game Commission taught "Wildlife Shares Our Land."

"We had a very enthusiastic group," said Professor Tom Carraher, director of community services for the college.

Purpose of the course was to discuss current resource issues and to hear experts in various fields tell what can be done to solve environmental problems. Each speaker was asked to give both pros and cons of resource management and to relate the resource to the nation's political and economic life.

SCS people, through Budd Fountain, the area conservationist at Albion, helped plan the seminar. The original request for help came through Carl Fox, the district con-

servationist at Madison, who served as the liaison between the college and agency representatives.—JOHN M. CROSS, *information specialist, SCS, Lincoln, Nebr.* ♦

Wheelchairs in the woods

The Forest Service, for the past several years, has been building short, self-guiding trails and other recreation facilities adapted to visitors who are blind or otherwise handicapped. One of the first was the Roaring Fork Trail in the White River National Forest in the heart of the Rocky Mountains near the ski resort of Aspen, Colo. Others are the Whispering Pines Nature Trail in the San Bernardino National Forest, northeast of Los Angeles, Calif., and the Catalina Desert Trail, in Sabino Canyon in the Coronado National Forest, 13 miles northeast of Tucson, Arizona.

To assure their availability during the height of the season, two recreation areas are open only to the handicapped and their families. One is the Mammoth Lakes Campground in the Inyo National Forest in the Sierra Mountains of east-central California. Another is the Trout Pond Recreation Area on the Apalachicola National Forest in western Florida. These areas have special features to accommodate persons in wheelchairs. ♦

Bringing water to the Arkansas Valley

The Arkansas Valley of southeastern Colorado is noted for its excellent crop-producing soils. Poor water supply, however, is a menace to the economy of the area.

The U. S. Bureau of Reclamation has a project underway to eliminate many of the water shortage problems. Through the Fryingpan-Arkansas Project, the Bureau plans to transport needed water from the western slope of the Rockies to the semiarid Arkansas Valley.

Efficient water management requires knowledge of how much water melting snow will produce and when it can be expected. To provide this information, the Soil Conservation Service has added three snow courses to the two already in the basin.

Automatic snow sensors are to be installed to make unnecessary the hazardous 14-mile trip into the mountains each month. These sensors, at the snow course sites, will indicate the amount of water in the snowpack, temperature, wind speed, and wind direction. This information can be available at a minute's notice.—JACK N. WASHICHEK, *snow survey supervisor, SCS, Denver, Colo.* ♦

Weeds, insects, and cotton under study in Mississippi

Basic research in weed and insect control and in cotton physiology will be conducted in the recently opened Delta States Agricultural Research Center in Stoneville, Miss. The work will be done in cooperation with agricultural experiment stations in the South.

The Southern Weed Science Laboratory will work especially on persistent weeds of Southern States. The work will include basic research on the fate of herbicides in the environment, weed control in aquatic situations, and biological weed control using insects and plant pathogens.

Study of the use of parasites and predator diseases, resistant plant characteristics, and other biological factors of the environment to control insects will be done in the Bio-environmental Insect Control Research Laboratory.

Increasing fiber and seed yield while reducing production costs will be the objective of the Cotton Physiology Laboratory. ♦

Review

Books

Natural Resource Conservation: An Ecological Approach. By Oliver S. Owen. *1971. The Macmillan Company, New York, N. Y. 593 pp., illus. $9.95.*

People are beginning to appreciate the importance and magnitude of conservation in its all-encompassing meaning and want clarification of the many issues and problems they hear and read about daily. This book, a timely textbook covering the broad multidisciplinary fields of natural resource conservation, is therefore a welcome addition to the conservation literature.

Covering such a broad and diverse field as natural resource conservation, as we define it today, in a single medium-sized text has required careful selection of important materials to illustrate basic concepts, problems, and solutions.

The scope and coverage of this book is best illustrated by listing some of the chapter titles: Nature of Soils; Depletion and Restoration of Soils; Water; Rangeland; Forest Resources; Wildlife; The Ecology and Management of Deer; The Ecology and Management of Waterfowl; Freshwater Fisheries; Marine Fisheries; The Pesticide Problem; Air Pollution; The Human Population Problem; Politics, Education, and Survival.

Students being introduced to natural resource conservation as well as the most seasoned professional conservationists can profit and derive knowledge, insight, and background from this book. Its clarity and straightforwardness may accomplish more conservation education and awareness than all the appropriately cited source materials that are supplied at the end of each chapter.

One of the most important recent developments in conservation is that of recognizing the necessity of using basic ecological approaches in analyzing problems and developing solutions. A very adequate presentation of "Ecological Concepts" is included in chapter 2, early in the text where it belongs. This presentation is fortified with well-chosen figures, charts, and photographs.

Chapter 3, Nature of Soils, in my opinion, is disappointing. It really does not update our knowledge of soil science from many previous sources published 10, 15, or even 20 years ago. This reviewer feels it regrettable that we do not have the particular expertise of author Owen in summarizing the recent advances in soil science that have been stimulated largely through the conservation movement during the past 30 years.

Information presented in chapter 4, Depletion and Restoration of Soils, is generally adequate, well presented, and to the point, but there appears to be an important misrepresentation on page 97. The distinction between activities and conservation assistance supplied to land owners, operators, and management planners by the Soil Conservation Service and the locally organized and operated soil conservation districts, established democratically under state laws, is not accurately portrayed.

Most readers give little attention to appendix materials. The two appendixes included in this book are somewhat extraordinary. Appendix A, The Tragedy of the Commons, is a reprint of a paper by Garrett Hardin, appearing in *Science* 162 (Dec. 13, 1968), 1243-48. Its inclusion verbatim testifies to the discrimination and wisdom of author Owen in selecting material for this textbook. Appendix B, Enforcement of the 1899 Refuse Act Through Citizen Action, will help satisfy the many readers who continually ask, "What can I do to help out in this hour of environmental crisis?"

If I were actively engaged in teaching conservation of natural resources, I would certainly use this textbook. Many details intentionally not covered could be supplied from other sources, and the weaknesses and discrepancies could easily be straightened out in class discussions. —Paul E. Lemmon, *formerly soil-woodland conservationist, SCS, Washington, D. C.*

Audiovisuals

Consider The Soil First. *1972. Soil Conservation Service, U.S. Department of Agriculture. 73 slide set and illustrated narrative guide. $13.50 slide set, $7.50 film strip.* This new color slide series shows how costly misuses of land can be avoided through the use of soil surveys. The presentation will be of interest to land developers, engineers, zoning officials, land-use planners, home-

owners, and educators. The set can be purchased from the Photography Division, Office of Information, U.S. Department of Agriculture, Washington, D.C. 20250. A cassette recording of the narration is available for $3.

New publications

Frost and the Prevention of Frost Damage. By William J. Rogers and Harry L. Swift. *1971. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 35 pp., illus. $0.25.* Describes the nature of frost and ways for protection from frost: heat conservation methods, sprinkling, irrigation, air mixing, passive methods, and heat addition. Discusses damaging temperatures to deciduous and citrus fruits.

Land Use Change in the Southern Mississippi Alluvial Valley, 1950-69—an Analysis Based on Remote Sensing. By H. Thomas Frey and Henry W. Dill, Jr. *1971. USDA Economic Research Service Agr. Econ. Rpt. 215. 26 pp., illus.* Special small-scale (1:125,000) aerial photographic imagery of the Southern Mississippi Alluvial Valley was compared in 1969 with conventional imagery of the region in 1950 to obtain data on land clearing, land use, and land change. It reveals major shifts in land use, and data collected in 1969 by remote sensing show that cropland has replaced forest areas as the dominant land use.

Selected Weeds of the United States. *1970. USDA Agriculture Hbk. 366. 463 pp., illus. $4 (Superintendent of Doc., U.S. Gov't Printing Office).* Illustrates and describes 224 species of weeds in the United States and their geographic distribution. Contains a glossary.

Diseases of Forest and Shade Trees of the United States. By George H. Hepting. *1971. USDA Agriculture Hbk. 386. 658 pp. $4 (Superintendent of Doc., U.S. Gov't Printing Office).* Brings together the information available on the pathology of many tree species indigenous to continental United States, exclusive of Alaska, and includes diseases occurring in adjacent parts of Canada. It also annotates the diseases of many introduced species grown widely for shade and ornament. Literature citations are listed in the back.

Environmental Quality, Second Annual Report, August 1971. *1971. Council on Environmental Quality. 360 pp., illus. $2.* Presents in depth two fundamental aspects of environmental quality—economics and legal developments; reviews the status of and trends in environmental quality and developments, particularly among the states, since last year; and describes some environmental problems in the inner city.

Specialized Grazing Systems, Their Place in Range Management. By Thomas N. Shiflet and Harold F. Heady. *1971. USDA Soil Conservation Service SCS-TP-152. 13 pp., illus.* A review of the published studies on specialized grazing systems in the United States and other countries. Gives results of deferred rotation and rest-rotation grazing.

Agriculture in the Environment. *1971. USDA Economic Research Service ERS-481. 11 pp., illus.* Articles from *The Farm Index*—"Environment: The Agricultural Perspective," "Using the Land," "Environment: Who Pays for What," and "The Legislative Record"—reprinted because "of the urgency and importance of environmental quality to both the researcher and the general public."

Soil surveys

El Paso County, Tex. By Hubert B. Jaco. *1971. 57 pp., illus.; maps 4 inches to the mile (1:15,840).*

Kooskia Area, Idaho. By Delmar H. Webb, Richard K. Preece, Oscar P. Mueller, and Mervin Stevens. *1971. 95 pp., illus. maps 3.17 inches to the mile (1:20,000).*

Meetings

February

12-16 American Association of School Administrators, Atlantic City, N.J.
13-17 National Association of Conservation Districts, Washington, D.C.
16-18 Land Improvement Contractors of America, Phoenix, Ariz.
28-March 2 National Farmers Union, Houston, Tex.

March

3-9 Associated General Contractors of America, Houston, Tex.
5-8 Association for Supervision and Curriculum Development, Philadelphia, Pa.
5-9 Society of Toxicology, Williamsburg, Va.
8-11 American Camping Association, New York, N.Y.
10-12 National Wildlife Federation, Mexico City, Mexico
12-15 North American Wildlife and Natural Resources Conference, Mexico City, Mexico
12-18 National Wildlife Week
25-27 Western Audubon Conference, National Audubon Society, Asiloman Beach State Park, Calif.
27-29 American Pulpwood Association, Atlanta, Ga.

April

5-7 Symposium on Engineering Geology and Soils Engineering, Moscow, Idaho
7-11 National Science Teachers Association, New York, N.Y.
15-20 American Society of Planning Officials, Detroit, Mich.
23-26 Association of American Geographers, Kansas City, Kans.
23-27 American Road Builders Association, New Orleans, La.
24-26 National Academy of Sciences, Washington, D.C.
30-May 4 Institute of Environmental Sciences, New York, N.Y.

Recon . . .

Heaven knows, soils are important in picking a site for a house—and a church. District conservationist Ron Fletcher of Lowville, New York, reports, "I have provided the Reverend Tom Kingston with soils information for various possible church locations."

Cherries Jubilee. A method of identifying and mapping red tart cherry orchard sites has been developed in northwest Michigan through the cooperative efforts of the Soil Conservation Service, the Extension Service, and the National Weather Service. Using the factors of soil, physiography, and climate, the red tart cherry site inventory pinpoints those areas where optimum land use is for cherry orchards. Northwest Michigan's red tart cherry industry gives that area a strong claim to the title "America's cherryland."

Wasteland's farewell. SCS Plant Materials Center plants to help revegetate Kahoolawe Island have survived their first year despite very low rainfall. Kahoolawe is the small island in Hawaii that the Navy uses as a bombing and shelling target. The plantings are the result of a joint effort by the U.S. Navy, the Forest Service, SCS, and the Hawaii Department of Land and Natural Resources. The latest progress report shows the plantings looking good as they go into the rainy season and their second year.

By the beautiful sea. With the increase in population pressure in coastal areas and growing demands for second homes and beach cottages, it has become a common practice to level sand dunes. The removal of these natural protective structures exposes the beach strand and the inshore lands to the full force of storm tides and hurricane winds. North Carolina has a law that specifically addresses itself to sand dune protection. The statute is a county-enabling act that, among other things, provides for the establishment of a shore protection line. A permit must be obtained before any alteration of the sand dunes seaward of this line is permitted.

Aquods assessed. As part of its effort to equitably evaluate agricultural land, the Florida Auditor General's office is turning to soil science. A comprehensive 2-day course in soils, presented by the SCS soil survey staff, gave state auditors an appreciation for soil survey information as a base for agricultural appraisals and tax assessment.

Help wanted. According to syndicated columnist Sylvia Porter, by 1980 about 1,200,000 workers will be needed in environmental careers —about twice the number for 1970. Details on some newly developing fields are described in two books suggested by Miss Porter—*Opportunity in Environmental Careers* (Odom Fanning, Universal Publishing and Distributing, $5.95) and *Career Opportunities: Ecology, Conservation and Environmental Control* (J. G. Ferguson Publishing Co., Chicago, $6.95).

Life in the soil. According to Agricultural Research Service scientists, a handful of moist fertile soil contains more organisms than there are people on the earth. The most numerous organisms are single-celled bacteria. Some organisms infect plant roots and are harmful. Earthworms are beneficial organisms because they loosen the soil. Termites and ants bring deposits from deep layers to the surface layer.

Is plastic the wave of irrigation's future? Those who think so can point to three major irrigation developments involving plastic: double-wall tubing for drip irrigation of row crops (the slow rate of flow per outlet gives good moisture penetration without runoff); trickle irrigation (plastic pipes and small lateral plastic tubes deliver water directly to the root system); and plastic catchments of rainfall (a plastic sheet on the ground "harvests" rainfall and delivers it to a covered storage basin).

A test for dispersive clays has been used by SCS's Soil Mechanics Laboratory in Lincoln, Nebr., for many years to identify highly erodible soils in semi-arid and arid regions. Now this test is to be used in all parts of the country. The laboratory plans to use the test on practically all samples received in the future. This test likely will become a routine indicator test for dispersion. It is particularly important in identifying potential channel stability.

Topographic maps. Almost all outdoorsmen know that topographic maps are the best maps not only for revealing all secondary roads but also for finding ways around a specific area. Not many realize, however, the ways that topographic maps can help locate promising spots to *catch fish.* For example, on topographic maps whenever contour lines cross a stream, they *always* form a V pointing upstream because the streambed invariably is at a lower elevation than the banks on

each side. Knowing the direction of flow of the stream, the fisherman can plan to move along the stream in the direction that he wants.

Contour lines sometimes touch but *never cross*. The closer the contour lines are to one another, the steeper the slope of the ground. This information helps the fisherman determine quickly the ruggedness of the terrain he must cross over to reach a stream. Also the steepness of the valley walls will indicate the nature of the stream itself.

Widely spaced contour lines combined with a meandering streambed mean a slow moving current. Conversely, closely spaced contour lines on both sides of the stream indicate that the water must be moving at a high velocity to carve such a steep, narrow valley. And fast water generally is good trout holding water. — JOHN BABBS, *"Pennsylvania Angler," December 1971.*

Those liquid pesticides left over from summer should be stored where they won't be damaged by cold weather. "Some of these formulations will separate at temperatures below 40 degrees, so to be safe store these materials in a heated area," says R. P. Mullett, an entomologist and associate professor with the University of Tennessee Agricultural Extension Service.

Mullett recommends that all leftover pesticides be stored in a dry area set aside specifically for storing pesticides and nothing else.

Mullett suggests building a pesticide storage room or cabinet for year-round use. It should be conveniently located, clearly marked on all sides so its contents are easily known, and kept locked at all times.

Grundy County, Iowa, school children are getting to know the soil around them. Currie Waugh, chairman of the Grundy County Soil Conservation District, says that 140 monoliths have been assembled and distributed to every school in the county as well as to the County Extension Director, County Assessor, and other officials. Students made the trays. SCS soil scientists, who just finished mapping the county, provided the core samples and put the monoliths together.

"Glassphalt." Thirty-five Future Farmers of America members from seven Iowa Chapters helped with a glass recycling public demonstration at the state fairground. More than 10 tons of ground glass were used for an experimental "glassphalt" test strip on a fairground roadway. The work included setting up areas for the demonstration, helping to unload vehicles bringing used glass, and shoveling bottles into the glass grinder. Des Moines public school children collected the glass.

CRIS (Current Research Information System), the USDA computerized information system, has access to some 24,000 pieces of research or research projects from six USDA agencies, 53 state agricultural experiment stations, and 25 other cooperating state institutions.

It can provide, among other things, the names of the people and institutions who did (or are doing) research, give a brief description of the project (title, objectives, work plan, and progress), and list important publications in specific research areas.

The Sawfish, an underwater mower, was recently acquired by the Forest Service for fighting lake vegetation. It is an example of how technology, which has contributed to environment pollution in the past, can also be used to improve the environment for the future. The Sawfish looks like a cross between a small landing barge and a water bug. It works like a barber's shears. The end of the 15-foot craft is a mass of cutting blades for slicing out rectangular chunks of water weeds. After the Sawfish cuts the weeds, a rakelike attachment is affixed and the cut vegetation is pushed to shore for disposal. Excessive vegetation can choke a lake, foul fishing lines, and eventually destroy a body of water.

The Los Angeles Planning Commission, in the aftermath of the February 1971 earthquake, has been working with SCS representatives to develop land-use limitation classifications that take into account potential slippage and slide areas. Soil information will be used as one criterion of limitation, with particular focus directed towards soil surveys on steep slopes and known slide areas.

Peddling plant packets. The Little Kanawha Soil Conservation District is again peddling its annual wildlife plant packets. This year the popular packet program provides, for $6.75, the fixin's for 10 white pine, 5 Colorado blue spruce, 5 Canadian hemlock, and a brace each of American hazelnut, silky dogwood, amur honeysuckle, Washington hawthorne, and Chinese chestnut. West Virginia squirrels and songbirds may well be waiting in eager anticipation.

"Will they ever return?" is the issue being raised by Rheingold Breweries, Inc., during a 1-year test of its "anti-litter returnable bottle" in New Hampshire and three Pennsylvania towns (Easton, Allentown, and Bethlehem). The strong antipollution stand of the *Manchester (N.H.) Union-Leader* was one reason company officials chose the Granite State as a test market. Rheingold President Theodore Rosenak said at the campaign kickoff in Manchester last fall: "If the experiment does not bear fruit, the conclusion will be inescapable that, for all of the public clamor about the part played by beer companies in litter, the consumer, at least in the test area, does not practice what he is ready to preach to others."

From the Administrator:

Understanding our resources

Consider the average American. During his lifetime he will use 26 million tons of water, 10,000 pounds of meat, 14 tons of milk and cream, 9,000 pounds of wheat, and great quantities of other products from the earth. In addition, he will build his home on the land, and he may fish in the lakes, hunt in the woods, and walk the prairies, parks, and seashores for health and pleasure.

How's the American land and water doing these days? Soil Conservation Service people are helping to answer that question.

SCS has developed the techniques and expertise to collect data on the condition of soil and water on the two-thirds of our land in private ownership or operation and to evaluate, plan, and design various resource management systems for its better use. But we still have much to learn.

Conservation work of any kind must be based on accurate and timely facts and forecasts. SCS will be even more deeply involved in the work of surveying and monitoring renewable natural resources, and their uses, in the years ahead.

Soil surveys provide the farmer and suburban land planner alike with necessary information. They are an indispensable planning tool. The SCS goal is a soil survey of the Nation that is current and complete.

The snow survey and weather supply forecasting program continues to grow in popularity. As new uses for the data develop, we must be prepared with the best possible methods for securing and analyzing information.

There is a need for better information on the rate, amount, and nature of sediment yields.

There is a need for better basic resource data and for a more complete system of monitoring the conditions of the Nation's natural resources. The current Conservation Needs Inventory supplies some of this information. We must encourage its widespread use.

Effective survey and monitoring work will be greatly helped by new resource technology. The National Aeronautics and Space Administration plans to place the first Earth Resources Technology Satellite (ERTS) into a near-polar orbit in the near future. The satellite will transmit data back to earth on urban and rural land uses, geologic features, observable pollution, and other aspects of the earth's surface. This information should be helpful to many groups.

There remains another vital aspect. When the necessary survey and monitoring information has been gathered by SCS and other agencies, there must be an effective "delivery system." Decision makers and private citizens all across the Nation should know about this information. Our increasing assistance to urban planners, town and county officials, farmers, and other landusers will require, as always, the best professional skills and personal attributes of SCS men and women.

Better resource technology; more complete survey and monitoring information; an effective method of relaying information to its ultimate users—SCS will be active in all of these areas.

In the 1970's, that average American who wants good land and water use and the men and women who make the decisions affecting him will be looking to us for help.

Kenneth E. Grant

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There's no question about what "SCS" stands for on this Oklahoma auto tag because that's Bill Vaught, the Soil Conservation Service's state conservationist in Oklahoma, fastening the tag to his car.



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U.S. Department of Agriculture/Soil Conservation Service March 1972



SOIL conservation
March 1972, Vol. 37, No. 8

This issue of SOIL CONSERVATION focuses on the close working relations between SCS and state fish and game agencies and other authorities in seeking to improve the quantity and quality of the nation's wildlife resources. The articles point to positive actions, from Delaware to California, on the part of thousands of fish and game agency employees, conservation district leaders, and SCS people. Their efforts are helping to preserve or increase wildlife and bring about opportunities for people to enjoy it.

COVER: Migrating geese beginning their descent to a 25-acre conservation pool in the Wilson Creek watershed, Otoe County, Nebraska. Photograph is by Erwin Cole.

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A host of wildlife

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

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Channels and wildlife

by James D. McCall
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and Russell Hyer
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Indianapolis, Indiana

How does a state achieve improved water control and at the same time sustain habitat for fish and wildlife? In Indiana interagency cooperation has brought the answer.

Both the Indiana Department of Natural Resources (IDNR) and the Soil Conservation Service recognize that wildlife is an important indicator of a healthy environment. Lands for wildlife are a necessity if we are to have a desirable ecological balance. Both organizations have over the years devoted much of their time and talents toward this objective.

During the 1950's and early 1960's, the IDNR's Division of Fish and Game was involved with the growing pains of reorganization and the changing methods of fish and farm-game production and had little time to spend on watershed planning. In 1965, the division began taking a more active interest in small-watershed and river-basin planning.

Richard "Gene" Bass, now director of the Division of Fish and Wildlife, personally made field studies of streams being considered for channel improvement with the SCS biologist, planning engineers, and soil conservationists. This kind of working relationship plus interest from local residents resulted in comprehensive plans for "natural stream corridors." These corridors provide public access for canoeing, fishing, hiking, photography, and nature study. The overall plan includes land treatment to reduce erosion and preserve a quality environment with multipurpose lakes for flood prevention, fishing, and other recreational uses.

More recently, the Division of Fish and Wildlife and SCS began working together to implement the new joint-agency policy geared to greater environmental emphasis, especially in those watershed projects involving channel improvement.

Currently, 17 watershed projects in Indiana are being re-evaluated to seek alternatives to old concepts of channel improvement. The following concepts have evolved from agreements between the two agencies and the conservancy districts representing the local landowners.

Channel work where it might damage fish and wildlife habitat will be kept to the absolute minimum. In the rolling areas of the state where impoundment sites are plentiful, both large and small floodwater-retarding structures will be installed where applicable to increase the watershed area from which runoff is controlled and reduce or eliminate the need for channel work. Most of the impounded reservoirs are of the size and depth necessary to meet Indiana standards for stocking with game fish and, in general, improving overall environmental conditions for man and wildlife.

Planning is complicated on flatland where the upper ends of the tributaries disappear in cropfields and homesites with no place for the storm water to go. On this kind of land, roads need ditches and urban developments need storm sewers.

It is here in the flatland that a tremendous effort is being made to develop and adapt new ways of solving an old problem. For example, bank-high trash drifts and debris blocks often cause stormflows to jump over the banks washing tons of topsoil





(Left) The Boggs Creek watershed channel was cleared on one side only. Vegetation on the opposite side was left unchanged for wildlife use. (Above) Big Raccoon Creek watershed supplies water for a continuous flow in some of the lower reaches of the main stream. The "natural stream corridor" concept is planned as the best use of the water resource.

from the valley floor and returning laden with silt to be deposited farther downstream. Formerly, the banks were cleared so that a large crane with a "clam shell" could be brought in to remove the debris block. Now, top-of-bank trees are saved, and small equipment such as handtools and tractors with cable winches are used to remove the debris. Equipment and labor needs may be further reduced by using explosives.

Where channel excavation is needed, work will be done from one bank only wherever possible. Existing tree cover on the other bank will serve as a filter strip, erosion-control stabilizer, wildlife habitat, and for other environmental purposes. Isolated specimen trees are to be marked and saved even though they may be on the working right-of-way.

Unavoidable damage to woody habitat will be repaired with new plantings. For each acre of mature trees removed, 1½ acres are to be planted. Young trees and shrubby type growth will be planted 1 acre for each acre removed. Areas that are adjacent to pasture are to be fenced to protect plantings from livestock.

Pools will be dug to serve as sediment traps during the period of construction. They will be cleaned out later and equipped with deflectors for fishing sites. Channel work construction through rock sections will include a series of pools and riffles to carry low flow. Pools will be 2½ to 4 feet deep with riffles about ½ foot deep. Shade trees will be saved or replanted to avoid thermal pollution. The bottom of the channel will be shaped or tilted to collect low-water flows, and oxbows can be retained and managed for fish and wildlife.

All wildlife habitat preservation and replanting areas are to be designated by permanent boundary markers and protected by permanent easements or fee titles.

An environmental impact statement for all watershed plans is to be prepared when tentative agreement is reached between IDNR and SCS and the local sponsoring organization. Both the plan and the environmental statement are sent to IDNR and other interested state and federal agencies for review and comment before final approval and funding.

Changes in land ownership and land use, economic fluctuations, improved standards of living, and overall population demands on available resources continue to present the two agencies with many problems. But the IDNR and SCS have agreed on guidelines to insure the most effective use of their services to the people of Indiana in planning and carrying out the fisheries and wildlife phases of their soil and water conservation programs. ♦

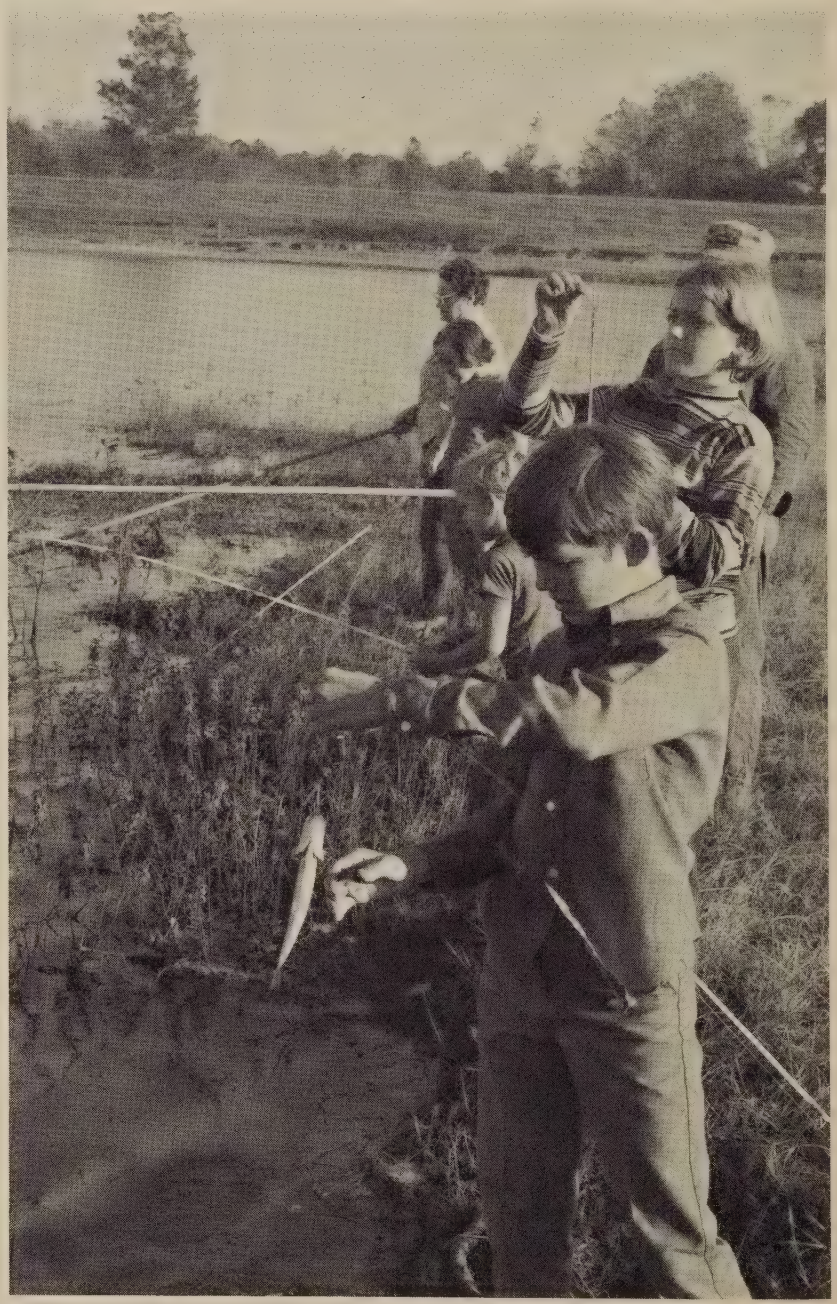
Landowners keep gates open for sportsmen

by Gene Warren
Public information specialist, SCS
Alexandria, Louisiana

Jimmy LaBuff ran his fingers over the sleek surface of the two big mounted bass and said, "I can tell you a lot of good fish stories that came out of those two small watershed lakes over near Reeves. I caught this 7-pounder one night at about 10 o'clock and this 5-pounder earlier in the evening."

LaBuff, who lives in Kinder, Louisiana, speaks with authority when it comes to fishing and hunting. He is past-president of the Allen Parish Rod and Gun Club. He knows a good thing when he sees it, and he says the two lakes provide lots of fishing for people in the community.

The Bear Creek Watershed Project, completed in 1960, was one of the first in Louisiana to be built under the Public Law 566 Watershed Protection and Flood Prevention Act. Two of the three dams in the project hold water; one impounds about 55 acres of water and the other 8 to 10 acres. The lakes were stocked with bass and bream by the U.S.



Fish for dinner? The Frederick LaPoint family can enjoy fishing in this Bear Creek watershed lake even though all the land surrounding the lake is privately owned.
(Opposite page) The LaPoint children take time out for a picnic.

Department of the Interior shortly after they filled with water. "Fishing was good after the third year, and it hasn't changed since," says LaBuff.

James Guillory, SCS district conservationist based at nearby Oberlin, points out that the major purpose of the watershed project was to stop the periodic flooding of several thousand acres of good cropland and adjoining roads in Allen Parish. This problem triggered sponsorship of the project by the Allen Parish Police Jury and the Calcasieu Soil and Water Conservation District. "The bonus," says Guillory, "is the fishing, hunting, and recreation that the flood-prevention lakes provide."



LaBuff says the largest lake—55 acres—is one of the best fishing spots in central Louisiana. "I figure that more than 300 pounds of fish per acre are caught in the lake each year," he explained. "That comes to more than 16,000 pounds, and that's a lot of fish. Any day of the week there are 5 to 10 people, sometimes more, fishing in that lake. I'd say close to 1,500 people fish there each year."

LaBuff likes to wade-fish, but many others fish from boats. "My boy and I caught 97 big bluegill bream one evening wading the edges. The secret to good bream fishing is finding their beds. We found 12 beds that evening. Catches like that are common though. There have been several 6- and 7-pound bass caught in the lake."

The two lakes are bordered by woods and ricefields. Water draining into the lakes from the ricefields is highly fertilized. "This makes the lakes more productive because the fertilizer helps grow food for fish," says Guillory.

The lakes attract ducks, too—some mallards, but mostly wood ducks. People have built blinds in the lakes and say hunting is good.

Camping, swimming, and boating in spring and summer are popular at both lakes. All land around one lake is owned by the Ragley Lumber Company of Lake Charles, but the company allows anyone to use the area.

Frederick LaPoint, one of several farmers whose land is protected from floods by the structures, says his boys learned to swim in the lakes. He has 10 children. "Those lakes are the main point of interest for us. We hunt, fish, and swim up there."

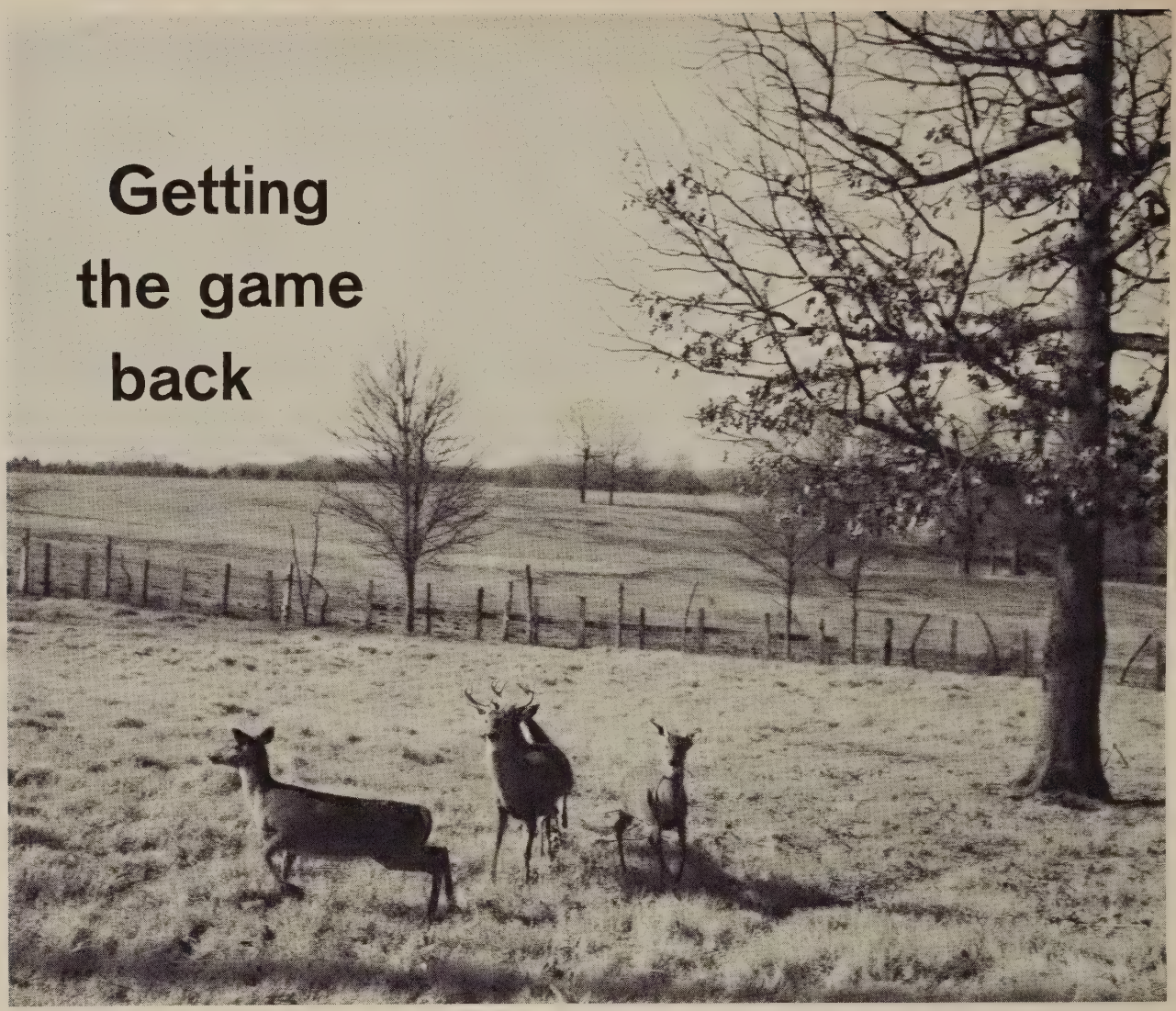
LaPoint remembers that before the structures were built most of his 2,000-acre farm flooded after a 3-inch rain. "Not long ago we had a 10-inch rain, and I didn't have as much flooding as before with a little rain. Also, before the project, kids had to walk through high water to catch a school bus, and sometimes they couldn't get to school at all. But that problem is solved now."

LaBuff's Allen Parish Rod and Gun Club was organized in mid-1970; it has 180 members. These include farmers and businessmen —men who like to hunt and fish and who are concerned about conservation and wildlife management. "We hunt and fish on lots of private land around here," LaBuff says. "Landowners are happy to let our members hunt because they know we are going to protect their property. We try to build good relations between the sportsmen and the landowners. We report law violators and do all we can to fight pollution on land and water."

LaBuff claims that as long as people don't abuse the land around the lakes the owners will leave the land open to the public. "Our club tries in every way to see that this is done. These lakes mean a lot to people in our parish."

Backing up LaBuff, Louis Vallee, a druggist in Kinder, La., and member of the rod and gun club, comments: "The fact that those structures stop water from flooding people's land, their houses, and the roads is a great thing; when you can make that same water provide recreation for the people, that's the icing on the cake." ♦

Getting the game back



by Rose C. Fleming
Public information specialist, SCS
Jackson, Mississippi

In the fall, Mississippians hunt when it's still hot. It's 80 degrees in the shade of the purple-leafed persimmon trees rifled by coon and 'possum.

In winter, deer is the big game. Hunters gather at dawn, blowing on cold hands, soothing rangy Walker hounds.

And in the spring, turkey season opens, and oldtimers haunt the woods, observing the habits of unpredictable gobblers, the better to bag them some quiet dawn.

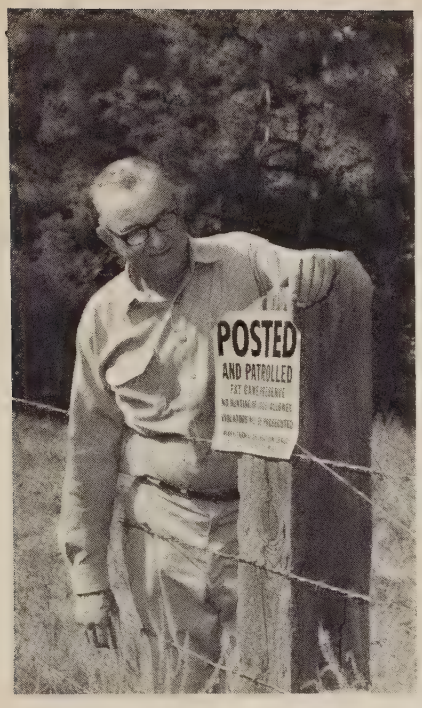
Mississippians—from the gulf to the prairie, from the clay hills to the delta—are loath to relinquish these pleasures that have gone with the land as they have known it for many generations.

But Mississippi is industrializing—even the rural areas. There are powerlines across swamps, and highways in sight of country roads. In many areas, the woods that drew the game are gone. More land is in cultivation, and more farmers are unwilling to permit the free and easy hunting of a generation ago—partially because their lands can no longer accommodate the vast number of "city" hunters and partially because the game itself has become increasingly scarce.

For these reasons Mississippians are developing a number of group wildlife plans to protect and increase game, insure better hunting, cement sportsmen-landowner relations, and in some instances provide added farm income.

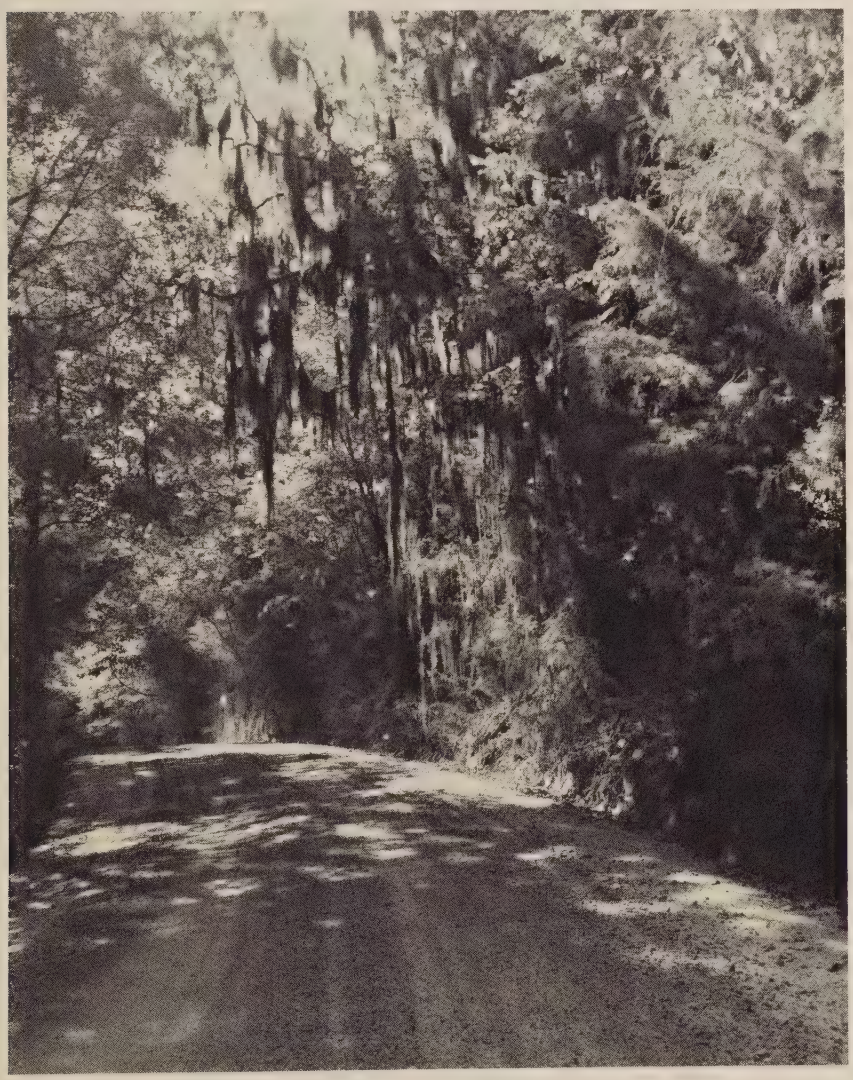
Throughout the state, about 109 groups have completed such plans for about 481,000 acres. The Soil Conservation Service, through local soil and water conservation districts, is providing technical assistance. In fiscal year 1971, 27 groups received planning help for 146,000 acres.

The largest area covered by a single wildlife plan takes in 45,000 acres in Yazoo County—



(Opposite page) Until the deer population increases on its 45,000-acre preserve, the Piney-Techeva Conservation League is keeping hunters out.
(Left) D. Travis Fouche, president of the league, checks one of more than 1,000 signs that have been posted around the area.
(Below) Along this road in the Piney-Techeva watershed, bluffs of loess soil rise 40 to 50 feet straight up, mossed over, and thick with trees dripping trumpet vine, wild grape, and muscadine—all fine food for wildlife.

an area along Piney Creek and Techeva Creek. About 2 years ago, 240 cooperators with the Yazoo County Conservation District banded together to form the Piney-Techeva Conservation League. This legally chartered organization is governed by a 15-member executive committee.

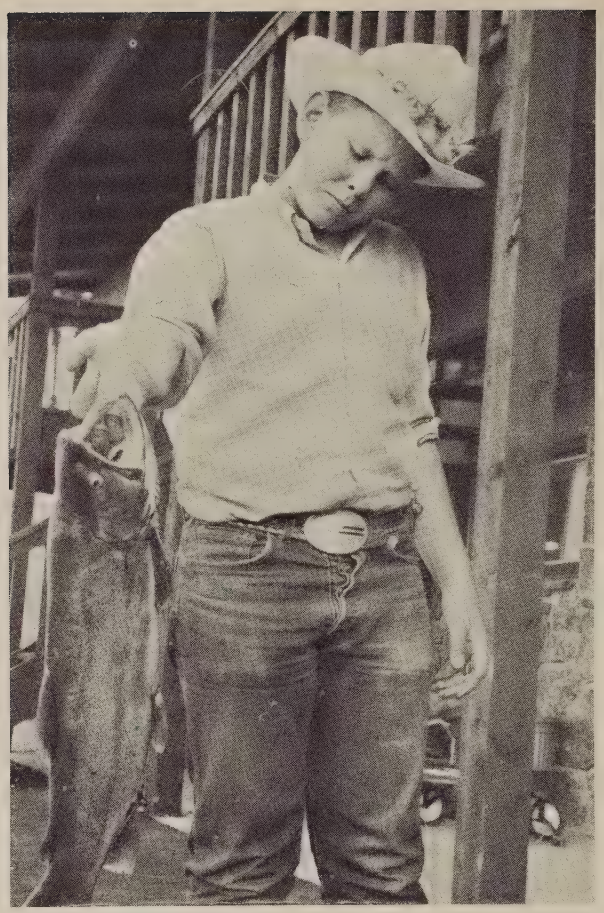


"Our idea was to have a preserve, posted and patrolled," said league president D. Travis Fouche, who lives in Benton. "We realized that soon we would have nowhere to hunt if we didn't do something. We've all signed a 10-year agreement to develop this area and control the hunting. Nobody can hunt deer or turkey here now. After the game is established, we may allow commercial hunting. If we do, we will probably divide the area into hunting camps of 4,000 or 5,000 acres each and lease them to hunting clubs that can build their own lodges."

More than 375 ponds have been built in the area, all with technical help from SCS. And SCS will help with habitat improvement programs once the wildlife becomes established. J. D. "Shorty" Goodwin, SCS district conservationist at Yazoo City, says that no special wildlife plantings are needed in the area at present. "According to our biologists, Edward Sullivan and Pete Heard," says Goodwin, "nature can provide native plants for habitat and food in this area for some time."

League vice-president E. A. Edgar, Jr., from Yazoo City, attributes game dearth in the Piney-Techeva area to illegal hunting. "Yazoo County was once a mecca for sportsmen," he says. "I have hunted here all my life. I want my son to have the same opportunity. At present we're protecting this land from illegal hunting. We have some turkey that the Mississippi Game and Fish Commission has given us, and we plan to stock some areas with deer."

All the league members have high hopes that in years to come deer will be abundant—along with rabbits, coons, 'possums, turkeys, quail, and squirrel—in their green forest. ♦



Fish and kids love a clean stream

by Douglas E. Paynter
District conservationist, SCS
Jackson, Wyoming

"Stream pollution in Jackson Hole?" asked a startled tourist. "I can't believe my eyes!"

The pollution the disbelieving tourist spoke of was a cowtown's discarded trash, accumulated over a period of several decades, along a mile-long stretch of Flat Creek running through the little town of Jackson, Wyoming.

In recent years, this same stretch of stream has been officially designated as a Children's Fishing Area by the Wyoming Game and Fish Commission. Only youngsters under the age of 14 are permitted to fish there. The commission keeps this part of Flat Creek well stocked with cutthroat trout.

In the summer of 1969, the editor of the *Jackson Hole Guide* conceived the idea of a "Kids' Fly Fishing Contest." Local merchants responded by providing more than $500 worth of prizes.

The contest was a rousing success. But many people, including contest judges and parents of the contestants, were shocked by the condition of the stream. During the contest, they saw children fishing among old rubber tires, oil drums, barbed wire, broken glass, tin cans—even the decaying rib cage of an elk. At the upper end of the fishing area, an oil leak sent a thin film of oil skittering over the water's surface. On the far side, a dozen houses had been built beyond the town's sewage disposal system. In several places, landowners had dumped fill along the edge of the stream.

Concern over the stream mounted. There was talk that a new bypass highway would obliterate the Children's Fishing Area.





(Opposite page) Bruce Moyer, 12, used a yellow-wooly-worm artificial fly to catch the cutthroat trout that won him the grand prize at Jackson's first annual Kids' Fly Fishing Contest.

(Above, left) Gussie Martin, knee-deep in water, helps load a boat with trash from the Children's Fishing Area along Flat Creek.

(Above, right) These volunteer workers are putting quarry rock in place to form a wing deflector across the creek. (Photographs courtesy of *Jackson Hole Guide*.)

Many people expressed a desire to help. The Jackson Town Council felt powerless because all the land was privately owned. Yet the 20 landowners seemed anxious and willing to cooperate. What could be done?

The Teton County Conservation District supervisors provided the necessary catalyst. They declared that, with SCS assistance, they would be happy to provide leadership for a restoration program.

The offer touched off a massive cleanup campaign that found 2 dozen volunteers, wearing hip boots and waders, splashing through the chilly September waters collecting trash. On two separate weekends, several truckloads were removed. Boats and rafts were used to transport the debris to pickup points.

Volunteers came from organizations such as the U.S. Forest Service, Chamber of Commerce, Wyoming Game and Fish Commission, Trout Unlimited, Jackson Town Council, Jackson Hole ENACT, Jaycees, and Jackson Hole Fly Fishermen's Club. Other help poured in from the rest of the community: a car dealer donated a tow truck to pull an old car body out of the stream; a repair shop donated special hand hooks for snagging trash from the stream bottom; a float-trip service provided two rubber rafts and a pram; a merchant served hot coffee and donuts; and a rancher loaned his dump truck to haul the trash away.

The results were overwhelming. The town council announced plans to extend sanitary sewers to the houses on the far side of the creek. The oil leak was located—the landowner agreed to stop the leak and, furthermore, offered to donate a parcel of land to Jackson for picnic use at the Children's Fishing Area. The local newspaper ran several picture stories on the cleanup. The Wyoming Highway Commission assured the group that the proposed bypass highway would be designed to complement the Children's Fishing Area rather than destroy it.

Last winter, Wyoming Game and Fish Commission officials and SCS developed a plan for further improvement of the trout habitat. Locations for rock jetties, deflectors, random boulders, and riprap were mutually agreed upon by the two agencies. A sketch showing the proposed work was presented to the landowners along the stream for their approval. Following this, a working agreement between these landowners and the conservation district was signed. The Game and Fish Commission allocated $1,000 toward the project, and the Jackson Hole Fly Fishermen's Club offered an additional $300.

In the spring of 1971, volunteers again put on their boots and placed, by hand, nearly 100,000 pounds of quarry rock for the habitat improvement structures. Where vehicle access was not a problem, the rock was loose-dumped to form jetties for velocity control.

The second and third annual Kids' Fly Fishing Contests have been progessively better than the first. And Jackson residents no longer hear cries of "stream pollution" from startled tourists. ♦

Cooperation brings more wildlife

In Illinois, where more than 90 percent of the land is privately owned, wildlife abundance results where habitat management complements agronomic and soil conservation practices in a practical land-use pattern. This is not always easy to do, but wildlife biologists in the Illinois Department of Conservation and SCS biologists and conservationists, working cooperatively, are combining their knowledge and experience to get the job done.

The two agencies cooperate in demonstrating pond management and in encouraging development of wildlife habitat around ponds. About 1,200 ponds are built each year in Illinois. SCS people plan and design the ponds for landowners and encourage fish stocking and management in accordance with techniques developed and recommended by the Illinois Division of Fisheries. Many of the ponds are stocked with bass and bluegill provided free by the division.

Because of the continuing need for new and better plants for wildlife habitat, erosion control, and other conservation uses, SCS operates 20 plant materials centers where specialists assemble and evaluate plants from all over the world. The center at Elsberry, Mo., examines new plants for adaptability to climates and soils in Illinois, Iowa, and Missouri. The Illinois Department of Conservation helps SCS test promising new plants at its field sites. The department produces proved plants in quantity at state-owned nurseries operated by the Division of Forestry and distributes them to landowners for conservation purposes at nominal cost. One such plant that has







to Illinois

by Rex Hamilton
Wildlife biologist, SCS
Champaign, Illinois



(Above) Howard Reves inspects the sericea lespedeza planted for wildlife food and cover around his 2-acre fish pond.
(Extreme left) This field of milo can provide plenty of waste grain for quail and doves. The multiflora rose hedge serves as a protective travel lane for small game and produces berries for birds.
(Left) This diked 140-acre wooded area is a greentree reservoir, attracting ducks and other waterfowl. It is flooded each fall before the hunting season.

gained wide acceptance is autumn olive.

The Illinois Department of Conservation also asks SCS to assist in developing resource conservation plans for properties owned or managed by the state. Typical of this assistance is a plan recently developed for about 16,000 acres bordering the upper end of Rend Lake in southern Illinois. The department is developing and managing the land as a wildlife refuge and public hunting area. SCS is helping with erosion-control practices, crop rotations, and engineering of water-control structures, dikes, and levees.

"Most of this land is tenant-farmed on a crop-share basis," says Bill Mestel, district game biologist at Mt. Vernon, Ill. "The farmer harvests his share of the crop. Our share is left on the field as food for wildlife."

Assistance to private landowners is also a cooperative effort between the Department of Conservation and SCS. SCS, with professional people in every county, has a good opportunity to stimulate interest in wildlife habitat on private lands. With about 95 percent of Illinois land in private ownership, this opportunity is extremely important. When the SCS district conservationist finds a landowner who is interested in a comprehensive wildlife development plan, he refers the landowner to the department's nearest district game biologist, who is responsible for the management of wildlife resources and habitat development in his district—generally eight or more counties.

The Pilgrim Wildlife Area in Perry County, Ill., is a project that evolved out of this referral system. Here, 35 landowners and tenants have developed about 13,000 acres for wildlife. To improve their farmland for wildlife, they planted 15 miles of multiflora rose hedgerows. These serve as travel lanes to and from

the croplands and provide protection from weather and predators. About 600 acres are planted to native grasses, legumes, and other wildlife foods such as buckwheat, lespedezas, and millet. More than 250 acres of woodland are protected from fire and livestock grazing. Nearly all of the farmers are cooperators with the Perry County Soil and Water Conservation District and have developed resource conservation plans for their farms.

Warren Burris, president of the landowners group, says, "Ponds in the Pilgrim area provide about 50 acres of fishing waters. We catch bass, bluegill, and channel catfish. Our record catch is a 10-pound catfish."

Of course, you don't have to join a group to develop your land for wildlife. Howard Reves owns 199 acres in Washington County, Ill., and manages 70 of those acres for wildlife habitat. He uses 112 acres for corn, soybeans, and wheat. Waste grain in these fields provides wildlife food adjacent to good cover. Reves also has 3 miles of multiflora rose hedges, 8 acres of trees, and 2 ponds, both managed for fish. He has trial plantings of autumn olive, hawthorn, crabapple, Ussurian pear, witchhazel, hybrid chestnut, shrub lespedeza, and scotch pine that he is field testing for the SCS plant materials center.

SCS helped Reves prepare a conservation plan, designed one of his ponds, and furnished the plant materials for trial. The Department of Conservation planned the wildlife plantings, helped with fishpond management, and donated multiflora rose and other plants.

Some wildlife developments bring extra income. LeRoy Rendleman, Union County, Ill., turned 140 acres of woodland into a shallow water greentree reservoir for ducks. He floods the land about the first of October to attract ducks for the fall hunting season. He drains the area each spring so the trees will not die. The Department of Conservation provided technical information on how to design and manage the shallow water development. SCS designed levees and a drainage system.

The U.S. Department of Agriculture's Watershed Protection and Flood Prevention Program offers still another opportunity for the Illinois Department of Conservation and SCS to cooperate with landowners in improving land for fish and wildlife.

In the Scattering Forks watershed near Tuscola, Ill., landowners planted 8,200 pine trees and 27,500 shrubs, including bush honeysuckle and autumn olive, along 5 miles of streambank. SCS district conservationist Joe Fasig coordinated landowner interest in the wildlife plantings. Dennis Thornburg, district game biologist of the Department of Conservation, helped farmers plant the seedlings with a mechanical tree planter provided by the department. Trees and shrubs came from state nurseries. More than 139 acres of streambank were seeded to a grass and legume mixture for stabilization and pheasant-nesting cover as part of the watershed protection project.

The Illinois Department of Conservation and SCS have common objectives: promote land-use practices that improve fish and wildlife habitat and assist in the conservation of other natural resources. Working together makes it easier to reach these objectives. ♦

A plot

by O. Eugene Hickman
Range conservationist, SCS
Medford, Oregon

For several years the Oregon Game Commission and the Soil Conservation Service have been cooperating in testing dryland grasses and legumes in southwestern Oregon.

The primary purpose of the experimental plots is to determine the adaptability of various grasses and legumes to the climate and soils in that part of the state.

The Game Commission uses the data to select the best adapted species for local areas where wildlife forage plantings are needed. These areas include badly depleted meadows and grassland in high-elevation deer summer range and the low-elevation oak-grassland that is important as winter range for deer.

The data also provide guidelines for establishing perennial grass seedings on the Kenneth Denman Management Area, a large tract of land managed by the Oregon Game Commission for wildlife. There, both cover and food are needed for pheasants and other upland game birds.

SCS uses the data from the experimental plots to help farmers, ranchers, and other landusers within the local conservation districts select the best species for various types of soils and for various uses, such as livestock forage,

today, a range tomorrow

stabilization of critical and eroded areas, road cutbanks, and fills.

Southwestern Oregon is somewhat unusual in that it is in a transitional zone amid the dry continental climate of eastern Oregon, the Mediterranean-type climate of California, and the mild, moist climate of the Willamette Valley. Native plants from all three areas often intermingle in this region forming a delicate ecological balance that is easily disturbed by man's activities. Where man has disrupted this balance and left the grasslands in poor condition, natural recovery is extremely slow. Some areas have been nearly denuded, and others have been dominated by weeds for many years.

Common species and seeding techniques for eastern Oregon, California, and the Willamette Valley have needed considerable testing in this region. Range seedings, for the most part, have not been successful. But now, as more and more species prove successful in the experimental plots, more and more rangeland will be revegetated and improved.

Since the first test plot was established by the two agencies in 1965, SCS has established more than 20 additional plots, eight in cooperation with the Game Commission.

Nearly all seedings must be made during October, just before fall rains begin. Each plot is seeded to various grasses and legumes that have value for livestock forage, wildlife habitat, or conservation plantings. Test species are selected from those that show promise in regions surrounding southwestern Oregon. Fertilizers are applied on some plots, and broadcast seeding is compared with drill-type seeding on other plots.

Because there are several critical stages in the development of a seedling, information is collected periodically so that the progress of each species can be documented and evaluated. Data collection usually begins on new plots in December, to determine if germination has occurred. Plant height and stand density are estimated at this time.

Early the following spring the new plot is checked to determine how each species survived the winter. A third evaluation is made at the beginning of summer to record plant height, stand density, and the severity of competition from annuals. During the second growing season another evaluation is made to determine the degree of survival through the hot, dry summer. Yearly observations are made thereafter to evaluate further progress.

If a species fails, it is hoped that sufficient data will have been collected to determine why it failed. When a species succeeds, SCS and the Oregon Game Commission have another tool to use in their efforts to aid range, wildlife, the soil, and the environment. ♦



Laying out a test plot and habitat improvement seeding in southwestern Oregon—a cooperative effort between the Oregon Game Commission and SCS.

Old Betsie gets a face lift

by Arvid Tesaker
District conservationist, SCS
Beulah, Michigan

and James R. Callison
RC&D project coordinator, SCS
Traverse City, Michigan





Old Betsie in northwest Michigan now sports 100 new erosion-control and fish-habitat structures and a beautiful protected watershed.

Old Betsie is a 93-mile-long cold water stream, originating at Green Lake, near the world famous Interlocken Arts Academy, and tumbling through rolling hill country on her way to Lake Michigan.

Indians called her Uns-zig-ze-bee. The French changed that to Aus Bec Scies. American sailors corrupted the French name to "Betsy," which was later refined to "Betsie."

The river was once a trout fisherman's dream, but recent years have brought deterioration. Loggers stripped her banks years ago and used her turbulent currents to float logs to mills. Two late 19th century hydroelectric dams still cross her—whether to remove them now is a public question.

Concerned about the Betsie, a group in 1952 formed the Betsie and Platte Rivers Watershed Improvement Association. Soil conservation district leaders with help from state, local, and federal agencies drew up a plan of action. Its main thrust was speeding up land treatment on the 166,000 acres of the watershed. Agencies performed their assigned tasks, and people got the

message, through group meetings and the press. Landowners applied agricultural, forest, and wildlife conservation practices. Conservation districts stepped up their tree-planting program.

Today, most of the land treatment has been done, so work is directed toward a problem left unsolved for many years—Betsie is still undercutting her banks and leaving ugly scars.

Early in 1969, some of the local people asked the steering committee of the Northwest Michigan Resource Conservation and Development (RC&D) Project for a boost to the Betsie River work. Their proposal was forwarded to the Soil Conservation Service and the Michigan Department of Natural Resources for action.

Logjams and logjam deflectors were built and eroded banks were riprapped to demonstrate how erosion could be controlled. All these improvements are natural appearing—as if the stream just happened to dump the logs and tree stumps, and chunks of rock just fell in place. Later the banks were seeded to grass, and trees were planted above the structures.

The demonstration was a success, so last summer work began on improving 24 miles of the stream. College students and local people assisted the Department of Natural Resources' Fish Division crews with this work.

Special recognition must be given to members of the Benzie Sportsmen Club and those of the Betsie River Sportsmen Club for their efforts over the years to get the stream-improvement program started. James Tanner, a member of the Benzie Sportsmen Club, has spent many of his 65 years on the Betsie River. He can remember when a person could catch brook trout nearly anywhere. Tanner says that 50 years ago the stream was deeper and narrower than at present.

John Drobena, canoe livery operator and a long-time resident on the Betsie, points out that the work on the riverbanks will not only improve trout fishing and control erosion but also restore the natural beauty of the stream.

Through cost-sharing, SCS will spend more than $100,000 in RC&D funds to protect about 23,000 feet of eroding streambanks. Stabilizing the riverbanks will eliminate about 7,500 cubic yards of sediment that are being deposited every year in the stream, in Homestead Reservoir, and in Betsie Harbor. Annual benefits from the installations are estimated at $1,400 for recreation and $6,700 for erosion control.

The overall project can have a favorable effect on both ecology and the economy. Improvements in water quality, fish habitat, and esthetic values along the stream will encourage greater recreation activity in the area and lead to increased tourist spending.

Work on the Betsie has spawned proposals for similar work on six other streams—the Manistee, Pere Marquette, Cedar River, Maple River, Black Creek, and Bear Creek. The RC&D committee has asked the Department of Natural Resources to begin surveys and inventories and plans to obtain cost-sharing funds through the Soil Conservation Service over the next 5 years.

An old history book calls the Betsie an "inconsiderable stream which empties into Lake Michigan." When her "face lifting" has been completed, she will stand scrutiny by other historians who will surely record her as "considerable" this time. ♦

(Opposite page) The Betsie River with improvements: natural looking logjams, logjam deflectors, and native stone protect the once-eroded banks. Grass, trees, and shrubs along the banks give added protection.
(Below) The Betsie River without erosion-control measures. Long stretches of streambank were seriously eroded before measures were installed.



A haven for wildlife

by James P. Gorman
Watershed planning specialist, SCS
Dover, Delaware

Delaware, like most Eastern States, is struggling to conserve its natural resources. Mushrooming land developments, with their usual people and pollution problems, are rapidly spreading south into the peninsula's fertile lowland. Competition for land and its natural resource assets becomes fiercer everyday.

Holding the line against this encroaching megalopolis is the land's number one conservationist, preservationist, ecologist—call him what you will—the farmer or rural landowner who understands well the lasting value of his natural resources.

An outstanding example of this close farmer-natural resource association is Otis Smith. In the mid-1950's Smith decided to go into the beef cattle business in his native Sussex County, Delaware. His first step was to find land that either was or could be converted into pastureland. Suitable land wasn't available, so Smith bought 800 acres of woodland that had been in cropland about 20 years before. He cleared 700 acres but left trees in a few selected spots to provide shade for cattle.

During a heavy rainy period in the late 1950's Smith found out why his land had been allowed to revert to woodland. A large part was poorly drained and under water. He immediately got in touch with the Sussex Soil Conservation District. The district, working with the Soil Conservation Service, helped Smith with his drainage problem. SCS gave technical aid in preparing a drainage plan that called for a minimum of channels to be constructed in conjunction with an extensive land-grading program.

Following excavation, spoil leveling, and grading, heavy rains again hit the area. Fresh, smooth channel slopes soon had numerous "blowouts." Heavy erosion, caused by surface water spilling over ditchbanks, filled channel bottoms with the highly erodible soil.

The near hopeless problem didn't stop Smith. He had the channels repaired and then constructed berms, having a maximum height of 18 inches and 3:1 back slopes, along both sides of all the channels. The berms diverted surface runoff laterally with the channels to selected spots where drop structures were constructed to ease the water into the channel.

As often happens, a drought followed the rainy period. Smith's pastureland became parched. But a wet perimeter in the lower third of the deep channels indicated that they were still drawing moisture from the subsoil. Smith and the SCS people set out to solve this problem.

They installed water-control structures designed to hold water levels above the critical moisture line. This equalizes the drainage effect of the channels when they are not needed. Water in the ditch bottoms also solves a channel maintenance problem. It prevents undesirable vegetative growth that decreases the effectiveness of the ditches. The small water-control structures are located so that nearly all channel bottoms are flooded when the top flash board is inserted.

It was obvious to Smith and the SCS men that the channel berms and slopes were going to require vegetative stabilization. Why not do so in conjunction with establishing a wildlife area along the channels, Smith asked?

A test area was set up that included 2,000 linear feet of ditchbanks where various varieties and combinations of stabilization and wildlife plantings were planted. The remaining berms and slopes were seeded to a temporary vegetative cover of Kentucky-31 fescue.

Next, all berms, slopes, and roadways were fertilized with generous applications of chicken manure. The wichura rose was sprigged on the top third of the berm 18 inches apart. Clusters or groups that consisted of a Japanese crabapple with autumn olive 15 feet on either side were planted on the lower third of the berm. Each cluster was 100 feet apart. In spots a redosier dogwood was used in place of autumn olive.

At selected areas on the ditchbanks and berms, reed canarygrass, crownvetch, weeping lovegrass, and bicolor lespedeza were planted.





(Top) This open channel on the Otis Smith farm, Fairmont, Del., is vegetated with wichura rose. Wildlife plantings cover the berms on both sides of the channel.
(Bottom) Natural shrubs and sericea lespedeza along the berm area of a drainage channel provide food and cover for wildlife.

By 1964, two things had happened. Otis Smith had converted his farm operation from cattle to field-crop farming, and it was evident that many of the wildlife plantings along his drainage ditches were going to be successful.

Smith decided to stabilize all channel slopes and berms with the wichura rose that normally does not exceed a height of 2 feet. He also decided to plant continuous plantings of autumn olive and flowering crabapple along one of the ditchbanks. A roadway on the opposite bank was seeded to a combination of sericea lespedeza and weeping lovegrass.

In the summer of 1971, state and federal conservation experts evaluated the area. Their report indicated that the wichura rose had stabilized slopes, berms, and other critical areas to the point that no evidence of erosion could be found. These areas have not needed maintenance in the 10 years since the original plantings were made. The rose plantings also offered valuable wildlife food and cover. The autumn olive, flowering crabapples, and red-osier dogwoods were covered with fruit. Sericea lespedeza had become the dominant plant along roadways. Natural growth of pokeweed, sumac, cherry, pine, and cedar—all of high value to wildlife—were interspaced with the domestic plantings.

There are many ironic twists of fate. Smith started out to be a leader in the cattle industry but may well end up being a pioneer in wildlife conservation. ♦

Pastures for geese



by Ivan L. Lines, Jr.
Biologist, SCS
Red Bluff, California

and Norman C. McGourty
District conservationist, SCS
Tulelake, California

Not many people have to face the problem of feeding about 3½ million waterfowl every spring and fall. This problem constantly confronts Bob Watson, manager of the Tulelake and Lower Klamath National Wildlife Refuges in northern California. He says, "I get a little anxious about the food supply when we have about 3½ million birds on the refuges at one time. We figure that these birds are eating close to a million pounds of food a day."

The Tulelake and Lower Klamath Refuges are a nesting area for about 5,000 pairs of ducks and geese. But the real influx—and the problem—occurs during fall and spring when a large part of the waterfowl in the Pacific flyway funnel through this area on their way south and on their return flight to northern nesting areas.

Refuge personnel have worked for several years to solve the food problem. A large part of the land on the refuges is planted to barley, oats, and wheat. This is designed for birds that feed in dry fields. Much of the remaining land is under water and managed for aquatic plants such as alkali bulrush, smartweeds, and pondweeds for those birds that prefer to feed in water.

The refuges are able to provide sufficient food in the fall, but they have had a problem providing enough food to satisfy the not-so-birdlike appetities of their springtime visitors. Waterfowl, particularly geese, eat large amounts of sprouting grasses and legumes during spring. Every year they would raid the private hay and pasture lands adjacent to the refuges, so something had to be done.

The Lower Klamath National Wildlife Refuge entered into a cooperative agreement with the Butte Valley Soil Conservation District. The refuge requested soils information and technical assistance in developing *goose pastures*!

A soil survey of the Lower Klamath Refuge was made by SCS. Those soils suitable for goose pastures were delineated on a soil map, consistent with the overall refuge operation. And, with SCS help, fields were leveled and borders built to facilitate irrigation.

Most of the sites selected for the goose pastures had two basic limitations—a high water table and a high salt content in the soils. These created several problems in selecting plant materials. Grasses had to be found that are tolerant of high salt concentrations and a high water table and, at the same time, provide palatable food for the geese.

Trial seedings on hundreds of acres of refuge land have been made using 'Alta' tall fescue, orchardgrass, tall wheatgrass, and 'Garrison' creeping meadow foxtail. Tall wheatgrass probably is the earliest to green up, but it soon becomes rank and unpalatable. Orchardgrass cannot always stand the salt and high water table. 'Garrison' creeping meadow foxtail was seeded in the spring of 1971 and looks very promising. But its overall desirability cannot be evaluated until it has shown that it will attract geese and can stand up under heavy grazing.

After the snow geese, cacklers, and whitefronted geese depart for the north country, the grass pastures serve as nesting cover for the resident waterfowl. Canada geese "hatch out" in April and May, and ducks come off the nest from early May into July. The grasses are then mowed and made into hay, leaving enough stubble for the ducks and geese that return in the fall.

"We intend to improve our goose pastures by trying new plant materials as they become available," says Watson. "These pastures will go a long way towards providing spring food and helping to stop depredation on nearby private lands." ♦

Geese have their own pastures on the Tulelake and Lower Klamath National Wildlife Refuges in northern California. These geese, on a spring stopover, are grazing sprouting grass. (Photograph courtesy of Tulelake National Wildlife Refuge.)

The emphasis is on fish and wildlife

by Floyd R. Fessler
Biologist, SCS
Nashville, Tennessee

Cooperation between state and federal agencies is not new in Tennessee. The Soil Conservation Service has worked closely with the Tennessee Game and Fish Commission since the 1940's on programs such as wildlife plantings for conservation district cooperators' farms, field trial evaluation of potential wildlife food and cover plants, and stocking cooperators' ponds with fingerling fish.

About 10 years ago this cooperation became channeled into a new effort: increasing the emphasis on fish and wildlife resources in connection with P.L. 566 watershed projects.

In 1962 an interagency biology work group was formed to assist in watershed planning. The work group was composed of biologists from the Tennessee Game and Fish Commission, the U.S. Bureau of Sport Fisheries and Wildlife, and the Soil Conservation Service.

The work group provides planning assistance in two phases. The first phase is an inventory of the fish and wildlife resources in the watershed. This study is made before the watershed project is authorized for planning. The biology work group determines the actual and potential fish and wildlife values in the watershed; these then can be considered by the local sponsors and the watershed planning party in developing the work plan.

The second phase consists of an evaluation study. After the watershed application is approved for planning, the biology work group studies the proposed measures for flood prevention to determine their effect on the fish and wildlife resources previously inventoried. From this study the need can be determined for associated or additional measures for developing or improving fish and wildlife resources or for minimizing damage to these resources.

This system has worked very well in Tennessee. Forty watershed projects in the P.L. 566 program have been studied and evaluated by the work group. Their recommendations are being incorporated into the design and construction of the flood-prevention measures. Thus, structural modifications are being made to reduce damage to fish and wildlife habitat.

For example, in the Tennessee part of the Crow Creek watershed in Franklin County the biology work group's field review resulted in the following modifications:
(1) Excavation of channels is to be done from one side of the channel only.
(2) On the opposite bank, only those trees are to be cut that have been marked for clearing by a two-man team—a biologist and an engineer.
(3) Low-head dams are to be installed in the new channels—15 to a mile as designated in the work plan. Low-head dams create pools for fish during low water but allow floodwaters to pass over.
(4) Where a channel is to be realigned, the bypassed segment of the old stream is to be retained and streamflow directed through it.

In the Weatherford-Bear Creek watershed in Wayne County, a watershed that has valuable fish and wildlife resources, more stringent modifications were mutually agreed upon. There, no channel excavating and realigning is to be done, and tree clearing, snagging, and bar removal is to be done in a way that avoids damage to fish and wildlife habitat.

Cooperation in Tennessee between SCS and state and federal game and fish agencies started early and continues to expand. Efforts that began years ago are benefiting the Tennessee of today, and what is being done now will preserve the state's rich wildlife heritage for years to come. ♦

Review

Two-thirds of Our Land: a National Inventory. *1971. USDA Program Aid 984. 20 pp., illus.*

Accurate information about our land and water resources can make the difference between success and failure in our effort to provide a livable and enjoyable environment. This booklet gives such information for privately owned rural land—land that covers two-thirds of our country.

To learn the character of this locally controlled land, the U.S. Department of Agriculture compiled the Conservation Needs Inventory (CNI) in 1958 and updated and expanded it in 1967.

This booklet presents the new data, effectively using color maps and charts. It tells us that 44 percent of this privately owned rural land is suitable for cultivation, 12 percent is suitable for limited cultivation, and 44 percent is unsuitable for regular cultivation. It shows that 3 percent has no conservation problem, 51 percent has an erosion problem, 19 percent has excess water, 25 percent has other unfavorable soil conditions, and 5 percent has adverse climate limitations. It gives acreage of land used for crops, pasture, range, forest, and other uses; the acreage of land needing conservation treatment; and the kind of treatment needed.

The vast amount of information in the Conservation Needs Inventory can be useful to many people. This booklet tells how to get further information.—ARMIN R. GRUNEWALD, *Resource Development Division, SCS, Washington, D.C.*

Priorities for Seed Technology Research. BY L. W. WOODSTOCK AND DAN NIFFENEGGER. *1971. USDA Misc. Pub. 1207. 20 pp., illus. $0.20.* More than 1,500 questionnaires covering nine major seed technology research areas corresponding to broad fields of study, 46 subsections of intermediate level, and 175 specific projects were distributed through 10 cooperating associations, including the American Seed Trade Association and the Canadian Seed Trade. This study is based on 515 replies and represents the most comprehensive survey of research priorities in seed technology conducted to date.

Warm-Water Fishponds. BY OLAN W. DILLON, JR., WILLIAM W. NEELY, VERNE E. DAVISON, AND LAWRENCE V. COMPTON. *1971. USDA Farmers' Bull. 2250. 14 pp., illus. $0.15.* This bulletin supersedes Farmers' Bulletin 2210, *Warm-Water Ponds for Fishing.* It is concerned only with warm-water ponds—not cool-water or cold-water ponds—and points out the importance of a favorable site, proper pond construction, erosion control, correct stocking, fertilizing, and weed control. And it tells how to manage a warm-water pond for fishing.

Outdoor Classrooms on School Sites. *1972. USDA PA-975. 22 pp., illus. $0.25.* This booklet is a source of ideas for developing and using outdoor classrooms on school sites. It explains how to get started, how to prepare a plan for the most comprehensive use of the school site, and where to get professional help in applying conservation practices that will improve learning opportunities.

Meetings

March

25–27 Western Audubon Conference, National Audubon Society, Asiloman Beach State Park, Calif.
27–29 American Pulpwood Association, Atlanta, Ga.

April

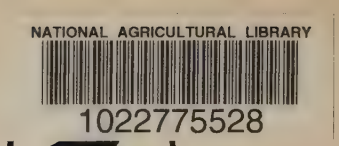
5–7 Symposium on Engineering Geology and Soils Engineering, Moscow, Idaho
7–11 National Science Teachers Association, New York, N.Y.
11–13 International Conference on Tropical and Subtropical Agriculture, Honolulu, Hawaii
15–20 American Society of Planning Officials, Detroit, Mich.
17–23 Earth Week '72
23–26 Association of American Geographers, Kansas City, Kans.
23–27 American Road Builders Association, New Orleans, La.
24–26 National Academy of Sciences, Washington, D.C.
30–May 4 Institute of Environmental Sciences, New York, N.Y.

May

1–5 League of Women Voters of the U.S., Atlanta, Ga.
3–6 The Garden Clubs of America, St. Louis, Mo.
4 Forestry and Wildlife Forum, Va. Polytechnic Institute, Blacksburg, Va.
7–11 The American Institute of Architects, Houston, Tex.
7–14 Soil Stewardship Week
12 Family Camping Federation, American Camping Congress, Chicago, Ill.
14–18 National Council of State Garden Clubs, Inc., Cleveland, Ohio
21–27 Urban Land Institute, 4th Annual Land Use Symposium, Toronto, Canada
23–25 Pollution Engineering and Equipment Exposition Conference, Chicago, Ill.
28–30 American Seed Trade Association, Portland, Oreg.

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From the Administrator:

A host of wildlife

In a recent talk to conservation district supervisors, I pointed out that no single group in America has done more to preserve and enhance the existence of wildlife than have our conservation farmers and ranchers. That contention can be backed up with facts and figures.

Farmers and ranchers have shifted more than 9 million acres from crops and other uses to recreation and wildlife purposes.

They have installed management practices for wildlife habitat on nearly 30 million upland acres and nearly 4 million acres of wetland.

They have improved more than 1 million feet of fishing streams, and they have installed more than 150,000 feet of fish raceways with which more and more landowners are entering the field of commercial fish production.

In small watershed projects, we also can count many benefits to wildlife. The 5,000 watershed lakes built under Public Law 566 and earlier authorizations provide a great deal of wildlife habitat, with many thousands of acres of new water surface, better water control downstream, and better water quality. In many projects, fish and wildlife conservation is a full-fledged purpose, with federal cost-sharing.

In addition to these deliberate and considered aids to wildlife, farmers also provide wild creatures with food, shelter, and water simply by applying good conservation practices.

A farmer who terraces rolling land and plants on the contour prevents soil erosion, but he also helps reduce siltation of our streams and lakes that can damage fisheries habitat.

A windbreak or shelterbelt prevents wind erosion and traps snow, reducing moisture loss. But these same windbreaks often provide cover for upland game birds.

Pastures, properly grazed and managed, provide seeds and a variety of insect life important to wildlife.

Stripcropping, with its alternate strips of cover plants and grains, supports many more wild creatures than the same field planted in a single crop.

And the 1.8 million ponds that SCS has helped install provide nesting, resting, and feeding areas for wildfowl. It is estimated, for example, that one-third of the waterfowl in the Montana portion of the Central flyway is produced on stockwater ponds.

Now we have an additional opportunity to be of service. SCS recently alerted its employees in 3,400 offices to help keep an eye on rare and endangered wildlife in their work areas. We have a similar effort in process for rare and endangered plant species. We feel sure these efforts will receive the cooperation of local district supervisors and conservation farmers and ranchers, who should welcome the chance to make still another contribution to the cause of wildlife protection and enhancement.

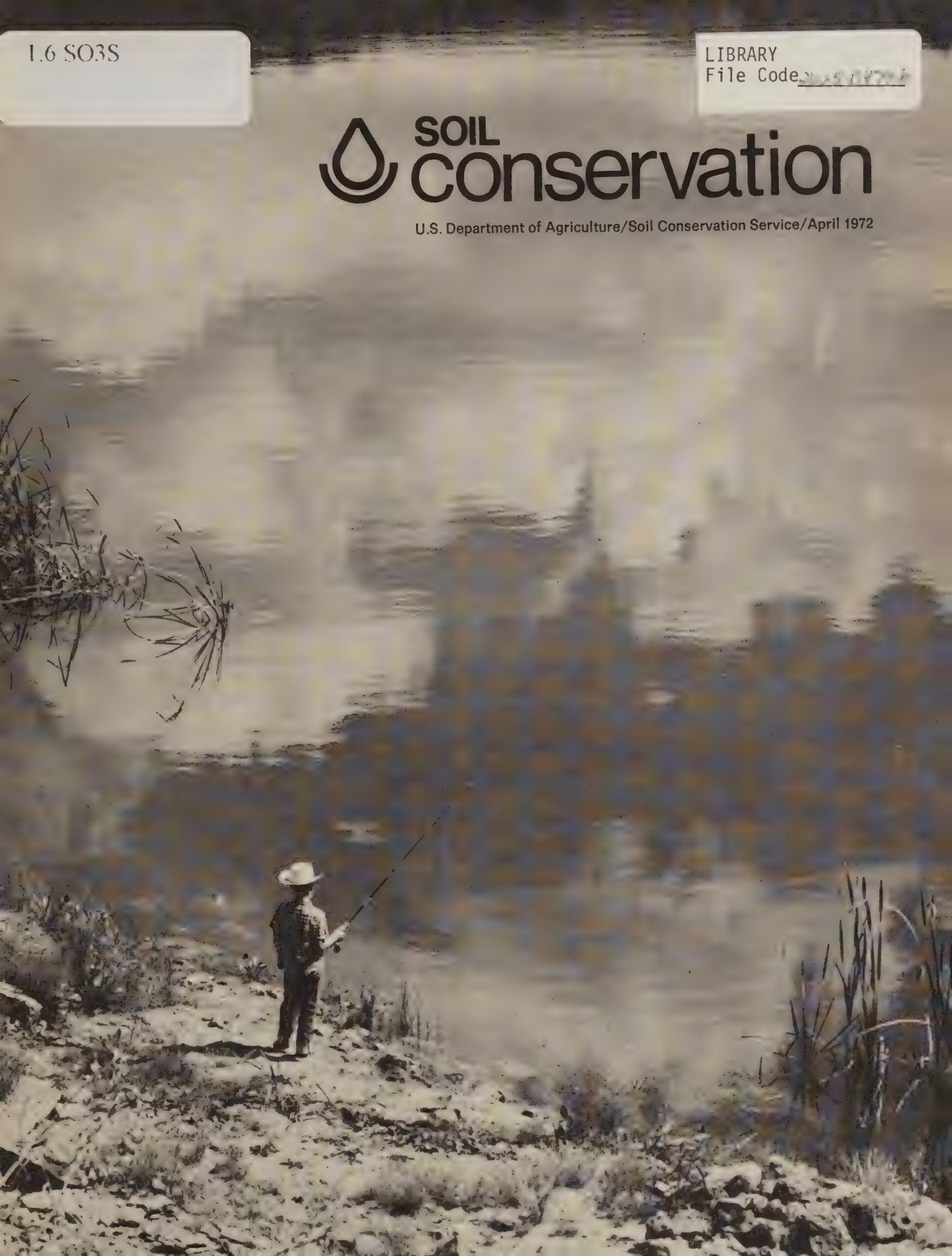
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SOIL CONSERVATION
April 1972, Vol. 37, No. 9

In this issue of SOIL CONSERVATION, SCS Administrator Grant looks back 37 years—when SCS was new—then looks ahead to new challenges.

Water is an often mentioned word in this month's articles. California reports on the problem of disposing of saline drainage water; Sheldon Boone outlines the long-range water needs for the West; and Gordon Smith tells how houseowners in an Auburn, N.Y., neighborhood got rid of an unwanted backyard pool.

If you're in the market for a miniature horse, don't miss the article by John George.

COVER: Byron said, "Men really know not what good water's worth." Any boy out to catch a fish does.—Aspen Lake, Iron County Soil Conservation District, Utah.

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

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Problems associated with disposal of saline drainage effluent

by Robert S. Miller
Area engineer, SCS
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Soil scientist, SCS
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and Stan Hobson
Assistant state conservation engineer, SCS
Berkeley, California

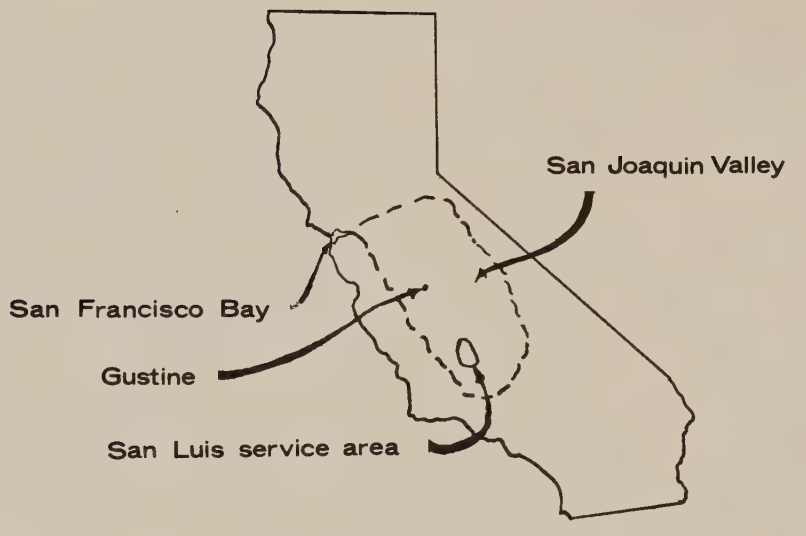
Disposal of saline drainage effluent has become a serious problem in some of California's irrigated-agriculture areas. A satisfactory solution lies beyond the purely technical aspects of developing physical processes or facilities to cope with this problem. Social and legal aspects must also be considered. Social pressures and awareness have brought tough new legislation as a step in precipitating a satisfactory solution.

California recently enacted the Porter-Cologne Water Quality Act, which requires the state to establish water-quality objectives and standards. The act also requires dischargers to submit a report of waste discharge, accompanied by a filing fee, to a Regional Water Quality Control Board. The board then issues permits and sets standards either for the quality of the discharge or the quality of the receiving water. The quality of both can then be monitored and close control maintained. Should the discharger fail to comply with board requirements the courts can levy fines of up to $6,000 per day.

The magnitude of the problem of disposal of saline drainage water can be illustrated as follows: In the San Joaquin Valley of California more than 1.5 million acres either need or will need drainage. This acreage can produce about 724,000 acre-feet of drainage water per year when under full development. Full development as used here means reuse of drainage water to a point where the quality is no longer suitable for agriculture.

Several years ago Congress authorized federal cost-sharing for the San Luis Reservoir and its irrigation delivery system to the San Luis service area. The project is to include facilities for collecting and transporting drainage waters from this service area. The plan was to collect the subsurface drainage water, transport it north, and release it into the Sacramento-San Joaquin River Delta for discharge in the ocean through San Francisco Bay.

Later consideration of the quality of this drainage water and its effect on the receiving waters



resulted in intensive investigations by several state and federal agencies to determine a means of reducing or controlling biostimulants such as nitrates. Drainage effluent contains about 20 p.p.m. nitrogen; water in the Sacramento-San Joaquin Delta, the proposed recipient of the effluent, contains about 5 p.p.m. With water-quality standards set at 5 to 7 p.p.m., some form of treatment process was needed to reduce the nitrogen content of drainage effluent to this level.

Six basic nitrate-removal systems were evaluated during a 3-year period:

(1) Algae stripping ponds designed to produce algae, thus concentrating the nitrates and producing a commercial byproduct.

(2) Covered 15-feet-deep ponds designed to minimize algae growth and wind-mixing. The system operates under anaerobic conditions; it is fed with methanol for bacterial metabolism.

(3) Vertical filter systems, which use methanol as a carbon energy source for bacterial metabolism associated with anaerobic denitrification.

(4) Symbiotic pond systems—a process whereby algae and nitrate-reducing bacteria live together in a mutually beneficial relationship.

(5) Shallow ponds—in these, water is about 6 inches deep and is spread out as in a ricefield. Grass is grown in the pond as the carbon source for bacterial metabolism.

(6) Eight-feet-deep ponds that are fed barley straw as the carbon source for anaerobic bacteria.

In a seventh system now being evaluated, submerged tile drains promote anaerobic denitrification.

Denitrification leaves a product that can be used in ponds for wildlife and fish, including catfish, and perhaps for industrial cooling.

The next logical step in the treatment process would be desalinization.

The present methods proposed for desalinization are reverse osmosis, solar distillation, and distillation with atomic power. Reverse osmosis appears to show the most promise at present. Solar distillation is inexpensive but is not feasible in the Central Valley at this time. Atomic power to supply heat for distillation of saline waters is a possible method but may be too costly.

Several alternative sites for the disposal of drainage effluent were considered during the investigation. Discharging into the lower part of the Sacramento-San Joaquin Delta near the town of Antioch, Calif., was selected as the least costly alternative, compared to pumping water over the coastal range of mountains and discharging it into Monterey Bay or constructing a closed outfall into the ocean.

Presently a facility is being constructed to collect and transport drainage effluent to the Kesterson Reservoir east of the town of Gustine. Storage at this site is a temporary expedient pending resolution of the quality problems associated with outletting the drain into the delta.

Considering the present amount of drainage water produced and the anticipated rate of development and evaporation, the Kesterson site has about a 10-year capacity for storing drainage effluent without outflow.

Reclaiming drainage water for multiple secondary uses such as algae production, catfish farming, and industrial cooling may yet prove feasible. Future research might lead to the use of saline water on excessively drained cropland or to more practical ways of desalting drainage effluent. ♦

Salinity—multiple headaches for planners

by Glen H. Loomis
Soil conservationist
River Basins Division, SCS
Washington, D.C.

"Summer snow" and "black alkali." These colorful terms describe the symptoms of a widespread and severe problem faced by many farmers and ranchers in the West.

In some areas, the land turns snow white as salt crystals form on the surface, virtually eliminating all plant growth. In other areas, the salt accumulation forms a black crust over the land.

This salt problem is not new. Salt related problems plagued ancient civilizations. Early Babylonians used the Tigris and Euphrates Rivers to irrigate the fertile valley lands. Eventually, silt and salt accumulations forced much of the land out of production. Today, this same area supports only about one-sixth the population it did centuries ago.

In irrigated areas, excessive application of water often triggers numerous problems. Excess water, poor quality water, and marginal soils add up to total loss of productivity in some areas. Poor water management coupled with a poor understanding of the potential complications often result in vast alkali flats that require extensive reclamation practices if they are to be restored to productivity.

More than 42 million acres were classified as irrigated lands in 1965. Almost 111 million gallons of water were withdrawn each day from our nation's water supply to irrigate these lands.

The salt content of irrigation waters ranges from a few hundred pounds to several tons per acre-foot. Water supplies for downstream users become more saline as salts are leached from irrigated soils into drains and then into rivers. Salt buildup is an existing or potential danger on almost all irrigated lands, including humid coastal areas where brackish water is used for irrigation. Salinity is a growing problem on nonirrigated cropland and rangeland. Saline seep areas have increased in the Northern Great Plains States. All of these areas need proper management if they are to be used efficiently.

It is apparent that poor drainage, overirrigation, and poor water quality can bring swift destruction to unsuspecting farmers and ranchers.

Salt balance

Maintaining or improving the salt balance in problem areas is a difficult task. Suitable water quality is as important as adequate quantity in meeting irrigation needs. Leaching is normally essential to the maintenance of sustained productivity and the maintenance of a salt balance. This means that of the total water applied, a sufficient amount must percolate through the crop root zone and remove enough of the dissolved salts to maintain root zone concentrations compatible with the crops to be grown. The salts removed should equal or exceed the salts applied through irrigation and fertilizers.

Salts dissolved in irrigation water collect in the root zone after repeated applications of water.



(Above) An adequate water supply, good soil, and appropriate water management add up to an excellent corn crop in Frio County, Texas. (Right) Poor water management, high salt concentrations in the water supply, and poor drainage add up to lost production in California's Imperial Valley.



Only negligible quantities of salts are removed by crops. Evapotranspiration adds to the salt concentrations as soil moisture is depleted.

Excessive quantities of sodium, biocarbonates, boron, chlorides, pathogenic organisms, and suspended solids in irrigation water limit production of many crops. Excessive amounts of water are used for leaching in some areas to retard heavy salt buildup. In extreme cases, fields are taken out of production for one planting to flush the salt accumulation from the root zone.

River basin planning and salinity

River basin planning offers a unique opportunity to address the interrelated conditions associated with salinity problems. Past planning efforts often considered irrigation, drainage, water quality, and soil suitability as independent planning units. This provided a fragmented and often inefficient solution to the total problem. Drainage needs should not be considered without irrigation. Irrigation needs should not be studied without considering water quality.

River basin planners are concerned with all resource problems. They are faced with questions about availability of water, timing of supply and demand, water quality, management demands, conveyance losses, return flows, salt balance, drainage requirements, quality of drainage effluent, ground-water supplies, and conjunctive use of water resources.

The Sevier River basin study in Utah brought about a unique water-budgeting program using an analog computer to better understand such interdependent relationships. The results of this study can provide useful information to enable cooperating groups to better manage the basin's total water resources and allow maximum use by fish and wildlife in conjunction with irrigation.

The recognition of suitability of soils for irrigation is a prime requisite for success in any irrigation endeavor. Some areas where salinity is a problem can only grow salt-tolerant crops.

New concepts in basin planning

Comprehensive planning allows for considering national and regional development objectives concerning the use and allocation of our resources. This includes the social and environmental issues that influence the planning process. Comprehensive planners must consider the possible alternatives by which they can meet irrigation and drainage needs compatible with environmental concerns. Basinwide planning provides the proper framework for examining the interactions of the following factors affecting the salt balance: (1) quality and quantity limitations of surface water; (2) quality and quantity limitations of ground water; (3) reliability of supply; (4) timing of supply and demands; (5) return flow to streams—quantity as well as quality; (6) return flow to ground-water bodies; (7) recoverability of ground water; (8) excessive onfarm use; (9) water use by phreatophytes; (10) tailwater return systems; (11) high conveyance losses; (12) evaporation; and (13) fish and wildlife habitat.

Opportunities for solution

Numerous methods are available by which planners can alter salt concentration conditions. Storage of good quality water for release during critical low-flow periods maintains suitable water quality in streams. Water treatment is expensive but positively insures suitable water quality. Diverting poor quality springs into evaporation ponds is being tested in the arid West as a method of reducing the salt load in streams and rivers. Proper water management contributes significantly to maintaining the salt balance on irrigated lands. Canal lining helps to reduce unnecessary seepage.

Possible ways of controlling salinity in the Colorado River include plugging salt wells and springs, desalting the flow of springs, controlling municipal and industrial waste loads, and minimizing the pickup of salts from the streambed. As an example, Blue Springs, a large spring near the mouth of the Little Colorado River, contributes a salt load of about 547,000 tons per year, or approximately 5 percent of the annual salt burden at Hoover Dam. A salt load reduction project is proposed to control the outflow from Blue Springs and make 140,000 acre-feet of demineralized water available for use in central Arizona.

It is obvious that many problems are associated with trying to balance competing demands for our water and land resources. But demands can be complementary. For example, drainage effluent can provide a water supply for wildlife areas.

Proper water management in conjunction with conservation practices can contribute significantly to solving many present and potential irrigation and drainage problems. Hopefully, in the future, "summer snow" and "black alkali" will become seldom heard terms. ♦

Long-range water needs for the West

by Sheldon G. Boone
USDA-SCS representative
Western U.S. Water Plan
Denver, Colorado

and John D. Hedlund
Hydrologist, SCS
Western U.S. Water Plan
Denver, Colorado

How can the natural resources of the West serve the needs of today and still be conserved to meet the needs of future generations? Enlightened planning at local, state, and federal levels is a must.

One of the national efforts to bring about enlightened water-resource planning in the 11 Western States resulted from the Colorado River Basin Project Act of 1968 (Public Law 90-537). This bill authorized the Western United States Water Plan Study, known as Westwide. The Department of the Interior has leadership in a coordinated federal effort to do the following:

(1) Determine the water supplies available;

(2) Determine the long-range water requirements;

(3) Determine the most economical means of augmenting the Colorado River;

(4) Develop a general plan to meet the future water needs of the entire Western United States.

The U.S. Department of Agriculture is cooperating in this study under the leadership of the Soil Conservation Service. The Forest Service and Economic Research Service also are participating. One of the important assignments under SCS leadership is to fix water requirements; these will provide data for developing alternative state water-resource plans.

Current water use

The surface-water supply in the 11 Western States is estimated at more than 500 million acre-feet yearly. More than 30 million acre-feet of water are pumped from ground-water acquifers; this results in an overdraft exceeding 6 million acre-feet. Water consumption is estimated at more than 70 million acre-feet. These figures alone do not cause alarm, but in the West there are areas of scarcity as well as of plenty.

In the water-abundant Columbia-North Pacific Region, only 5 percent of the 378 million acre-feet water supply is consumed in a year. In the Upper Missouri-Yellowstone River Region, 20 percent of the water supply is consumed. About 40 percent of California's supply is consumed, and nearly all of the supply from the Colorado and South Platte Rivers and that from the Rio Grande River are consumed.

Consumption exceeds supply in the Great Basin Region, because there is no outflow from the region and terminal lakes generally are receding. Water withdrawals, however, are two to four times the consumed amounts. In many basins where water use is high and streamflow dwindles, salinity increases and poor water quality results.

About 60 million acre-feet of water are consumed in irrigating 27 million acres of cropland and pasture. This accounts for 85 percent of all water consumed. This figure includes losses incidental to irrigation. In addition, riparian phreatophytic vegetation in some areas reduces water supply available for economic development as much as 40 percent. The recovery of water through salvage, resulting in increased streamflow, must be weighed against possible loss of some wildlife habitat.

Municipal and industrial use, including thermal power and mining, presently account for less than 1 to more than 10 percent of the water consumed in resource regions of the West.

Although consumptive use is small for such purposes as fish and wildlife, recreation, hydropower, navigation, and water-quality management, the instream flow requirements are significant in many basins. For example, requirements for navigation below Bonneville Dam on the Columbia River amount to 58,000 cubic feet per second, equal to an estimated 42 million acre-feet annually. This water, however, is jointly used for fisheries, recreation, hydropower, and water-quality management. The maintenance of streamflow for summer fisheries is in direct competition with critical-period irrigation diversions in many streams in the West.

Potential water savings

Water consumed by crops accounts for only 70 to 85 percent of the water depleted in the process of agricultural irrigation. Improved water conservation and irrigation management can result in savings of several million acre-feet of water. Cutting incidental

Water Requirement Data to be Collected

Function	Offstream requirements		Instream requirements		Agency responsibility*	
	Withdrawal	Consumptive use	Instream flow	Consumptive use	Lead	Assist
Municipal and industrial	X	X			EPA	ERS; SCS; FS
Agricultural—						
Irrigation	X	X			SCS	BR; BIA
Livestock	X	X			SCS	BLM; FS; BIA
Electric power—						
Thermo	X	X			BR	FPC
Hydro			X	X	BR	
Minerals	X	X			BM	
Recreation	X	X	X	X	BOR	FS
Wild and scenic rivers			X	X	FS	BOR
Fish and wildlife	X	X	X	X	BSFW	
Estuaries			X	X	BSFW	
Terminal lakes			X	X	GS	
Quality management (undesignated to function)	X	X	X	X	EPA	
Navigation			X	X	BR	CE
Natural losses (phreatophytes, etc.)			X	X	SCS	
Nonirrigated wet meadows (wetlands)			X	X	SCS	BSFW
Artificial ground-water recharge	X	X			GS	
Export (transmountain diversion, etc.)	X	X			GS	
Legal and institutional—						
Treaties, etc.	X	X	X	X	BR	
Evaporation from regulating reservoirs	X	X			BR	

* BIA—Bureau of Indian Affairs; BLM—Bureau of Land Management; BM—Bureau of Mines; BOR—Bureau of Outdoor Recreation; BR—Bureau of Reclamation; BSFW—Bureau of Sport Fisheries and Wildlife; CE—U.S. Army Corps of Engineers; EPA—Environmental Protection Agency; ERS—Economic Research Service; FPC—Federal Power Commission; FS—Forest Service; GS—Geological Survey; SCS—Soil Conservation Service.

losses to irrigation in half could provide 5 or 6 million acre-feet of new water to the Westwide area, where it is desperately needed. In riparian phreatophytic areas also, the water salvage potential can provide several million acre-feet of water to deficient areas. For example, viable programs are needed for salvaging some part of the 700,000 acre-feet of water now being uneconomically used in the Rio Grande Region in Colorado and New Mexico.

Reducing regulatory waste, spills, and other losses provides potential for water salvage in many areas. A part of the 1.4 million acre-feet of water lost in the water-short Lower Colorado Region has salvage potential. Conservation and salvage of water in water-short areas are viable alternatives to augmenting current water supplies.

Water productivity

Within appropriate environmental, institutional, and social guidelines, regional water planning must also be concerned with efficiency in water use or productivity of water. The concept of "productivity increases," long used with regard to labor and land, should be applied to water. Where available water is a limiting factor to a farmer, an industry, a recreational or urban development, plans should be developed to maximize the output of goods and services per unit of water use.

Studies on the South Platte River in Colorado have shown that, in the last 30 years, water used for irrigation increased 60 percent, and the value of crops produced (constant dollars) increased 350 percent. The increased use of water through fuller water supplies, improved systems, and more timely application of water no doubt accounted for much of the increased production, but other factors were important also. Improved crop varieties, better management, fertility practices, and soil conservation practices, along with the selection of higher value crops, also helped increase output. The "productivity increases" concept must be applied to all water uses if future demands are to be met.

The importance of determining water requirements

Determining long-range water requirements, one of the objectives of the study, is paramount to developing a water plan. Unless water requirements can be determined with some accuracy, no dependable plans can be developed. A sound approach is to

develop a range of alternative requirements based on a different set of assumptions regarding the effect that technology, cost, and other factors could have on water use. For example, how much water will be consumed in producing a bale of cotton in the year 2000 or 2020? Because water requirements for a given acre of cotton vary only slightly, regardless of yield, the most important factor then becomes the yield of cotton per acre. If this is known, the water required to meet a stated demand for cotton can be determined.

But the factors affecting crop yield are many. Yields might be influenced by farm policy, net farm income, production costs, levels of cultural and water management, and the use of agricultural chemicals, to name a few.

The scarcity and cost of water also influence the efficiency of water use. Urban areas, by plan, can either conserve water or use large quantities inefficiently. The number of irrigated parks, golf courses, or open spaces is a major factor. Industrial use will vary, depending on water availability and recycling costs and constraints on waste disposal.

More and more decision makers are demanding an analysis of alternative approaches and plans before making decisions concerning major water uses. The Westwide effort will provide a comprehensive view of the West's water requirements, which is needed to develop alternative solutions and resolve conflicting uses. It will provide a dynamic and flexible base for updating, modifying, or redirecting the water supply to its best use. ♦

Little horse, big business

by John C. George
Soil conservationist, SCS
Norristown, Pennsylvania

What do Merchant Marine officers do after they retire? Raise miniature horses? Tony Garulo does—at the Gettysburg Miniature Horse Farm in Adams County, Pennsylvania.

Garulo, while on a voyage to Argentina aboard the McCormick Line freighter that he captained, heard stories about tiny horses—only 28 inches high.

Reaching Argentina, Garulo and two friends from the McCormick Line visited the Falabella Ranch. They liked the wee horses and also Garulo's idea of creating a tourist attraction and sales outlet for the horses in this country. Garulo, Don Rohe, who lives in New Jersey, and a third partner in Argentina formed a legal partnership. After Garulo retired, they set out to make the idea a reality.

The unusual breed, which was established by the Falabella family of Argentina, is a pint-size version of standard breeds, including Pinto, Palomino, Appaloosa, and Clydesdale. The horses, on the average, are 28 inches high; some are much smaller. They weigh between 70 and 125 pounds. The Falabellas have a horse that weighs only 25 pounds.

"People often ask me what the horses are used for," says Garulo. "I tell them they can do anything a big dog can do, and more. These horses are intelligent, gentle, and easily trained. They can pull small carts with light loads. A child weighing about 80 pounds can ride a little horse."

The Falabellas established the miniature horse over a period of about 100 years. Garulo says, "The breeding technique involved in miniaturizing these horses is a well-guarded family secret. There are only about 300 of these horses in the world." Garulo



(Left) Tony Garulo's miniature horses, brought to this country from Argentina, are attracting tourists to Adams County, Pennsylvania.
(Opposite page, top) Fernando, a helper who came to this country from Brazil, shows off his favorite mini-horse.
(Opposite page, bottom) SCS helped with the layout and design of this pond on the Gettysburg Miniature Horse Farm.



hopes that in the near future Señor Falabella will come to Adams County and show him how to breed these horses.

Garulo has about 47 of the wee horses at his farm in Adams County—the largest number outside of Argentina. The horses were shipped by plane to Florida, where they were quarantined for 3 days, and then on to Adams County by truck.

Before Garulo decided to settle in Adams County, he looked at properties in many states. Most of the areas he investigated lacked the tourist attractions that were needed to get his commercial recreational development started. "When I finally got to Adams County, I knew I wanted to settle here," says Garulo. "With the National Military Park in the area, plus extensive development of the tourist industry in and around Gettysburg, the area had just what I needed for my business."

Garulo's experience with farms and livestock was rather limited. Because of his scant agricultural knowledge, he sought as much technical assistance as he could from state and federal agencies, including the Soil Conservation Service.

Garulo originally went to SCS for technical help in building a pond. The pond was to serve as a focal point for the 100-acre recreation enterprise and also to supply water for his stock. When Garulo learned about farm conservation plans from the SCS people, he immediately signed up as a cooperator with the Adams County Soil and Water Conservation District.

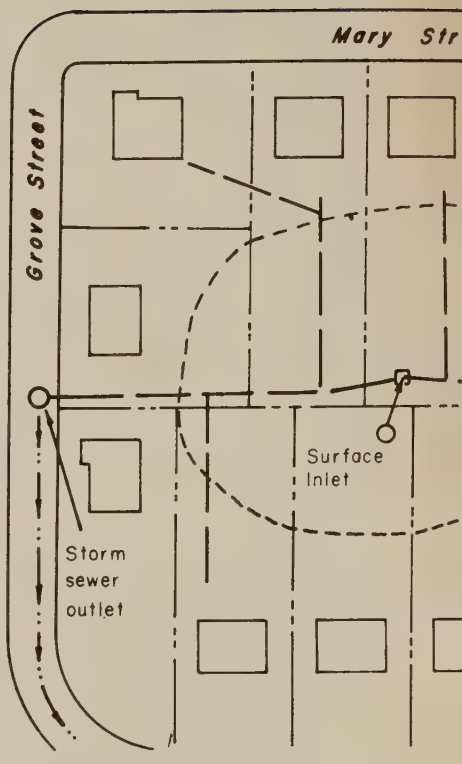
Garulo used his conservation plan as the basis for developing his entire enterprise. The architect hired to make a master development plan used SCS soils information and interpretations in finding sites for the buildings.

Garulo puts it this way: "Before we knew what kind of soils we had, we just guessed where to put our new barn, restrooms, refreshment stand, and cottages. But now the soils data determine the final decision on placement. As far as I'm concerned, any development not based on soils information is not a very intelligent one." ♦



Drying out a neighborhood





(Left) After almost every storm, landowners along Mary and Grove Streets had an unwanted pool in their backyard. It attracted debris, mosquitoes, and the neighborhood children.
(Center) A tile drainage system, running through several backyards, drains the water out of the lowland and carries it to a storm sewer in the street.
(Right) James Hotaling, Cayuga County Conservation District manager, left, and Canio Maggio, a neighborhood resident, examine one of the drop inlets of the drainage system.

by Gordon S. Smith
Public information specialist, SCS
Upper Darby, Pennsylvania

In the right place, a pond can be a real asset. In the wrong place—for example, your backyard—a pond can be a hazard.

In Auburn, New York, 2 years ago, 14 families along Grove and Mary Streets had a backyard pond they didn't want.

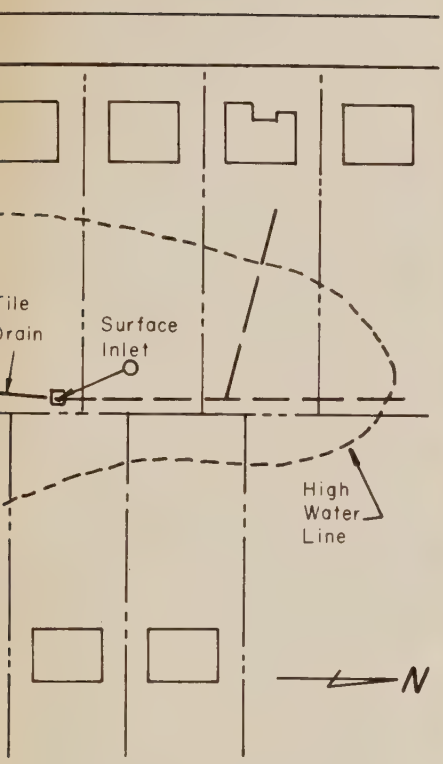
Such ponds and wet acres are not uncommon in this central New York area. Pockets of wetland, an aftermath of the glacial epoch, dot the countryside. The 14 families in Auburn live on the edge of a new housing development that borders one of these large wetland areas. In fact, SCS soil maps indicate that the area was part of a swamp 15 years ago. Fill had been added, and houses had been built as the city expanded.

The water hazard didn't appear until the last few houses were built along the lower side of the one-block area. Elevating the front yards of these new houses resulted in a low dike across the back end. A prolonged rainy season formed the unwanted pond as runoff was bottled up behind the houses.

"Our backyards became a community health hazard," recalls Canio Maggio, one of the houseowners. "The stagnant water attracted almost as many neighborhood kids as it did mosquitoes. Something had to be done."

A dozen truckloads of fill were hauled in by the houseowners in a losing battle with the pond. The poor results forced them to look for a better way to get the water out of their yards.

First, they asked the city mayor, Paul Lattimore, for help. The mayor was sympathetic but could not solve the problem entirely. The Auburn Public Works Department could extend storm sewers to a point on the street near the water problem. But the drainage system needed to carry water from the wet area to the storm





sewer would have to be constructed at the landowners' expense because the system would run through private land. Mayor Lattimore advised the group to contact the Cayuga County Soil and Water Conservation District for help.

Conservation district officials agreed that the problem was serious. They asked Charles Barnett, SCS district conservationist in Cayuga County, to give technical assistance.

It was decided that a simple underground tile drainage system running to an outlet in the street could remove the water. The same system on a larger scale is used by farmers to remove excess water from their fields.

The backyard drainage system consists of 6-inch tile running 450 feet in a straight line from the upper part of the problem area, under the wet area, and through Maggio's side yard to the street where it connects with the city's storm sewer. Maggio's house is on one of the lots that formed the water-blocking dike.

Two vertical drains placed at the lowest points in the wet area and directly above the tile line let surface water down into the tile line. Several 4-inch-tile lines branch out from the main line.

At the street end of the drainage system, the city installed an outlet to the storm sewerline.

Cost of the project was estimated at just under $1,000. Each of the landowners paid $86.50. Several of them arranged for additional tile drainage under their yards. At very little added expense, this made the drainage even more effective.

The neighborhood drainage project was finished in a few days, and almost immediately the wet backyards showed signs of drying out. The landowners seeded the area and landscaped it with flowers and shrubs.

Maintenance has proved to be a minor chore, according to the landowners. About twice a year they clean out the two surface inlets. They keep a small bank account to handle repairs, but repairs have not been needed yet.

Many heavy rains have hit the area in the 2 years since the drainage system was installed. Each time, water ran into the surface inlets leaving the once-flooded backyards as dry as other parts of the block.

"You could say a big neighborhood problem went down that tile drain," comments Maggio. "The general appearance of our block has been greatly improved. Property values are increasing each year. There's just no way to measure the dollar value of this drainage work" ♦

Acres and acres of classroom

by Clifford C. Sorensen
District conservationist, SCS
Stockton, California

Long before ecology became the vogue word it is today, Edith Friedlaender Bondi of Oakland, California, was intent on teaching conservation to young people.

Mrs. Bondi, the wife of a consultant to Shell Oil Company, Arnold Bondi, has turned a 200-acre ranch in the hills of southeastern Alameda County near San Francisco Bay into an outdoor classroom for environmental studies.

Mrs. Bondi calls the ranch Timna, because the mountainous area looks so much like Timna in Israel where King Solomon's Mines are located. She has set up a nonprofit organization—Timna Foundation, Inc.—to operate the ranch for the education of youth.

"There are two mountains and two and a half canyons on the property," says Mrs. Bondi, "and a creek that flows under rocks in the summer. Plants other than grass include mostly digger pine, oak, juniper, and manzanita on the slopes and mountain mahogany and willow by the creek. Deer abound in the area, as do valley quail, owls, and hawks. There are even coyotes, which are sometimes heard at night."

Mrs. Bondi signed up as a cooperator with the Eastern Alameda County Resource Conservation District in 1967. Then she went to the Soil Conservation Service office in Livermore for advice in developing her ranch as an outdoor classroom.

She received onsite help in planning a pond, an access road, hiking trails, and a septic-tank disposal system.

The SCS staff at Livermore also provided maps, instruction on how to build watering devices for birds, and help in developing and maintaining wildlife habitat. On their own time, they assist with outdoor class instruction at Timna, discussing soils, grasses, and the topography of the area.

The youth education ranch provides many learning opportunities. Students explore the grounds and study plants and how they relate to the sun, the slope, and other soil and climatic conditions. The older youths sometimes help teach the younger ones.

Youngsters, from third-grade age to age 15, come not only from Oakland, Livermore, and other communities in Alameda County but also from other parts of the United States. A few come from Israel, France, and Morocco. Some are there for a day—arriving in the morning and leaving in the afternoon. Others stay for the 11-day session.

Mrs. Bondi has been teaching in public schools in New York and Oakland for more than 30 years and has worked with Girl Scouts and with boys and girls of her own Jewish faith. Many a former Girl Scout sends her offspring to Mrs. Bondi for the summer sessions at Timna.

Mrs. Bondi says outdoor learning areas can be of tremendous assistance to teachers. "With the help of books, pamphlets, and other material on conservation, teachers can prepare youngsters in the classroom for outdoor sessions," she says. "At Timna, the young people have a sensory contact with real examples of what they have studied indoors. I try to open up youngsters' eyes to the outdoors."

There are no roads on the ranch. "I am not permitting any vehicles whatsoever," Mrs. Bondi says. Timna has a new cabin with bathroom facilities, a meeting room, and a museum for exhibits explaining Timna flora and fauna. The students prepare these exhibits with their own drawings, poems, and reports. The old lodge is occupied by caretakers who live there year-round. There's a pond for fishing and studying water-related plants and wildlife.

Mrs. Bondi also conducts outdoor classes for teachers, college students studying to be teachers, and high school students. Resource specialists from SCS and other agencies often assist. Classes are limited to 12 students at any one time.

"I've always enjoyed working with youngsters," Mrs. Bondi admits. "My husband, our daughter and our son, and I enjoy hiking and have learned a lot from nature trails in national parks. I am trying to reproduce something like that for youngsters at Timna."

Mrs. Bondi's efforts in stressing the importance of conserving our natural resources to youth and the community have not gone unnoticed. The Eastern Alameda County Resource Conservation District selected her as the "outstanding conservationist" for 1971. ♦

Reading, 'riting, and 'rithmetic—not in this classroom.















Green tees and dry fairways

by Don Brackett
District conservationist, SCS
Gresham, Oregon

Golfers used to say that to play Portland's Riverside Golf and Country Club course in winter or spring it helped to have web feet.

Playing in those rainy months often meant wearing rubber boots or returning to the clubhouse with water in your shoes. On many days, although other courses in that part of Oregon were busy, the Riverside course was unplayable.

The problem was frequent flooding by surface water. The area, in the Columbia River flood plain, has deep, naturally fertile soils that are poorly drained.

Past efforts to improve conditions on the golf course had been only partly successful. Three small pumps and several thousand feet of drainage tile could not accommodate the water from winter and spring rains. For days, fairways were nothing less than water hazards, with standing water, soggy soil, and drowned-out turf.

Club members for years had considered overhauling the drainage system and rebuilding the golf course. A larger membership and heavier use of the course eventually brought the decision to go ahead.

In 1969, a golf course architect drew up plans for the rebuilding. The next year the club persuaded Dick Malpass to take the job of course superintendent.

An immediate step by Malpass was to visit the East Multnomah Soil and Water Conservation District and ask for help in upgrading the drainage system for the golf course.

It was estimated that nearly 30,000 feet of tile, a 30-horsepower sump pump, and a 12-inch turbine pump would remove the excess water efficiently. The existing tile would have to be discarded. It was considered inadequate to do the job.

In the fall of 1970, contractors installed 20,000 feet of tile and a new pump station. Two small lakes were built as holding ponds, but they were located for maximum scenic effect.

The drainage system passed a major test in January of 1971. A warm chinook wind and 1½ inches of rain on 8 inches of snow produced what could have been course-saturating conditions. The new system, however, carried 4 million gallons of water off the course within 24 hours. The pumps handled the water at the rate of 4,250 gallons a minute, discharging excess water into the nearby county-maintained drainage canal. Golfers played the course the following day.

Wild ducks have found the golf-course lakes to their liking. At least five broods have been hatched there and have remained on the lakes.

Maintenance crews have planted dwarf purple willow and silky dogwood for beauty and erosion control. There will be other plantings to provide food and cover for birds and other wildlife.

Members of the Riverside club are delighted with the results of their investment in the drainage program. The course, they report, is no longer a "part-time golf course and part-time swimming hole." ♦

(Below) This tiny lake is a beauty spot on the Riverside Golf and Country Club course near Portland, Oregon. It does double duty as a holding pond in a new drainage system.



Dry dam saves cropland

by George J. Newberger
District conservationist, SCS
Upper Sandusky, Ohio

"Yes, I'm interested in saving Lake Erie, but I want to start by saving my own soil right now." This statement was made in 1970 by Tom Reber. He is now saving his rich bottom land on the Sandusky River and helping to protect Lake Erie too.

"We had learned to live with the flooding caused by backwaters of the Sandusky River," states Reber, "but the gullying and washing away of productive soil was too much to accept."

Of the 800 acres in the Tom Reber farm south of Upper Sandusky, Ohio, in Wyandot County, about 350 acres are highly productive, nearly level bottom land. Water from the nearby uplands has to flow across the bottom lands on its way to the river. And that's what brought on the trouble.

Assistance from the Soil Conservation Service in solving land-use problems was not new to Reber, but this time what did he need? A diversion, a waterway, tile? He didn't want a grassed waterway using up his cropland. And the cost of enough tile to handle all that water—"that would take all the fun out of farming," quipped Reber.

SCS suggested a dry dam. Reber thought it over and accepted the suggestion. The dam would be just like his farm pond, only it would be dry most of the time. It would capture storm water draining from the 80 acres uphill and hold it temporarily. A perforated pipe would ease the water out of the pond and into 10-inch subsurface field tile that would carry the water harmlessly into the Sandusky River.





(Top) This dry pond stores water during periods of heavy rainfall and runoff and releases it slowly through a 10-inch subsurface tile system. The standpipe, in the center, keeps discharge within tile capacity.
(Above) Another view of the pond holding runoff from a 12-hour, 3-inch rainfall. The pond empties in about 30 hours and is ready for the next storm.

When Reber got the cost estimate for the dry dam, he thought he would be spending a lot of money for a pond he couldn't use. The Rural Environmental Assistance Program of the Agricultural Stabilization and Conservation Service helped by paying part of the construction costs.

Was it worth it? "That dam really works," reports Reber. "We had three bad storms last spring, and each one dumped 3 inches of rain on us in less than 12 hours. The dam held every bit of it. Each time, the dam emptied in about 30 hours and was ready for another storm." ♦

conservation in action

MIADS all in a row

There's a new "handmaiden" in the Soil Conservation Service's River Basins Division. Her name is MIADS, and she works with untiring diligence, speed, and precision.

MIADS, actually MIADS/360, is the acronym for "Map Information Assembly and Display System," an automatic data processing system coded for use on IBM System 360 computers.

The first version of MIADS was developed by the USDA Forest Service's Forest and Range Experiment Station in Berkeley, California, in 1964. Since then, MIADS has grown up into a "real beauty."

The system consists of a set of four relatively simple computer programs and one IBM "package" program. Each program in the series performs certain fundamental operations that involve manipulating and processing "point-areas" mapping systems. MIADS isn't very sophisticated in terms of what is possible at the state-of-the-art level of automatic data processing, but it can combine various operations in diverse orders and sequences to provide a powerful, flexible, and economical tool for processing planimetric maps.

MIADS can:

(1) Create and maintain a master file of coded data for a series of maps for any project area.

(2) Translate or convert sets of codes from one or two base maps to a new set of codes on a new map.

(3) Combine and merge original or translated codes from two maps to derive a new map.

(4) Perform frequency counts and expansions for the various codes that comprise a map and summarize the contents of a map.

(5) Graphically display the maps on a printer if desired.

MIADS is a computer-facilitated program that produces "symbolized" maps or tabulations or both. Simply, MIADS works like this:

(1) Base maps are prepared depicting the physical location of the desired category.

(2) Transparent grid sheets are placed over the base maps and fixed to established reference points on the maps. Each cell on the grid sheets can represent 1,000 acres, 100 acres, 40 acres, 10 acres, or whatever size area is preferred.

(3) The desired data, in coded form, are transferred from each base map. Coded symbols, for example, for showing only a few of many kinds of ownership possible for the system are: NF for national forest; NP for national park; PD for public domain; PT for privately owned land; and MR for military reserve.

(4) The data from the coded grid sheets are then transferred onto punch cards for input to the MIADS computer program. MIADS output can be in the form of computer-produced maps or tabulations.

The system can be used to combine two or more categories. For example, maps and tabulations showing areas of coniferous cover in national forests can be made by combining cover type and ownership categories. Also, boundary changes of planning units or other specific areas can be coded into MIADS. All previously recorded data can then be extracted by these new delineations. Through MIADS, updated information can be added to the computer system to provide a continuing and current "data bank" of valuable information for quick retrieval. Clearly, the system can combine thousands of combinations of interchangeable units of specific data.

Given the required base maps, MIADS can be part of the means for direct, accurate answers to questions like these:

> How much privately owned land in the W watershed of X county of project Z is subject to moderate or severe flooding? And where is it?
>
> How much land predominantly unsuitable for cultivation in Y county under project Z is currently being used as cropland? As pasture? As forests and woodland?
>
> Where, within 10 miles of city A, are all potential sources of pit gravel suitable for fine and coarse concrete aggregate?
>
> Where and how much land has been converted from cropland to some other agricultural use within the last 5 years? From agricultural use to urban or residential use?

Neither MIADS nor other similar systems can immediately or completely answer questions like

these. But a competent technician can easily state these diverse selection criteria through a series of explicit commands to MIADS, using the related base maps, to get either the answers or summarized data. The technician need not be a computer expert. The "language" of the system can be learned in as little as a day.

Already, MIADS has been of considerable value in river basin planning. The system has been used in the California Region Comprehensive River Basin Study covering approximately 100 million acres; the Lower Colorado Region Comprehensive River Basin Study covering more than 90 million acres; and the Southwest Washington State area. Colorado, Texas, Alabama, Kentucky, West Virginia, and Illinois are in the process of initiating the program. And many other areas are considering a conversion to this versatile program, truly a beauty of a system.—GLEN H. LOOMIS, *River Basins Division, SCS, Washington, D.C. and* GEORGE E. MCGRATH, JR., *Information Division, SCS, Washington, D.C.* ♦



Soft sell for clear water. (Photograph submitted by Doug Culhane, district conservationist, SCS, Sioux Falls, South Dakota).

Basin leveling saves water

Basin leveling saved John Fornes of Buckeye, Arizona, enough water on a 70-acre cotton crop to irrigate 50 acres of alfalfa—and he did it with salty, silt-laden irrigation water.

A supervisor and cooperator with the Buckeye Soil Conservation District, Fornes has farmed several years in the Buckeye area. During this time he has been looking for answers to a variety of problems.

After he developed his overall conservation plan with Bob Tobin, former SCS district conservationist at Buckeye, he decided to try basin leveling to solve some of his problems. He started on his toughest area—one with two serious problems: tight soil and poor quality water.

Sources of water for this area are the Buckeye Canal, which receives its supply from underground, and the Gila River. Mixed ground water and surface water averages 2,800 parts per million of salt. Sometimes, when only wells near the farm are used, salt content can reach 5,000 parts per million. More than 2,500 parts per million of salt can cause a serious problem.

The water is also high in sodium, which creates even more of a problem. In addition, water from the Gila River carries a large amount of silt, which seals surface soils and practically stops water from moving into them.

SCS people studied the area and gave Fornes several alternative leveling designs. Fornes elected to break the field into 10-acre benches, 330 feet wide and 1,320 feet long, with no slope in any direction. After leveling, he put the field into a good conservation-cropping system.

Today Fornes can see many significant results. Before leveling, he used 8 acre-feet of water per acre; today, he uses only 4½ acre-feet. This amount meets crop needs and provides for adequate leaching of salts. Fornes has reduced the cost of water and labor on the 70-acre field by $2,100.

Before leveling, some areas in the field were always too wet, and others always needed water. Today the water is spread evenly, and all areas have the same amount of moisture in the soil.

Before, the silt-laden water from the river rolled off the bottom of the field. Today it soaks into the ground, not only benefiting plants but also helping to leach salt out of the soil.

Before, a good irrigation man had to stay with the water all the time it was on the field. Today an irrigator gets uniform irriga-

tion and stays in the field only long enough to set siphon tubes.

Fornes is completely sold on the practice of flat leveling. "Someday, all of my land will be flat," he says. "There are disadvantages as well as advantages, but I'm very pleased with basin leveling, and I definitely recommend it."—JOHN H. FRONSKE, *district conservationist, SCS, Wellton, Arizona.* ♦

Water—even in August

Until about a year ago, farmers in Wyoming's Star Valley had more water than they needed in spring but not enough for their crops when August rolled around. Flooding along Dry Creek in spring was an annual problem.

In 1960, a group of farmers requested help from the Star Valley Soil Conservation District. The Watershed Protection and Flood Prevention Act (Public Law 566) seemed to be an answer to their problems.

A detailed plan involving sprinkler irrigation and flood-control measures was prepared with technical assistance from the Soil Conservation Service. The Star Valley Dry Creek Project required the approval of the U.S. House and Senate agriculture committees. In 1969, after Congressmen toured the area, the project was authorized for construction. In 1971, the work was completed and today this area has water—even in August.

The watershed project was needed to supply water to stabilize and improve the income of the farmers. The farmers chose a gravity sprinkler irrigation system to bring water to their thirsty fields. In such a system, the force of gravity provides the power. In mountainous areas, a pipe is used to intercept the water at a high point. The weight of the water confined in the pipe provides the pressure—the same principle is used in water-tower systems in municipalities.

Before the advent of the gravity sprinkler, farmers watched their crops grow vigorously in spring, only to see them wither in the hot August sun. Hay, which potentially could yield 3 tons, was dried out by the sun and yielded only 1 or 1½ tons. Grain, which could yield 60 to 80 bushels, yielded only about 35 bushels. Pasture, which could have produced 4 animal-unit months, produced only 3 animal-unit months.

But the sprinkler system and flood-control channel changed all that. Crops are now getting water late in summer. This was made possible by eliminating the old canal systems and replacing them with pipeline, which extends from Dry Creek Canyon down into the valley. Other pipe, like giant fingers, branches off the main pipeline, bringing water to 3,503 acres and benefiting 55 farmers.

The Dry Creek Watershed Project covers 4,280 acres of private land, 13,870 acres of land administered by the Forest Service, 157 acres under the Bureau of Land Management, and 80 acres of state land.

Much work was done high in the mountains where the water originates. Without the work carried out in national forests to control flash flooding, the sprinkler system could be ruined.

The Forest Service, on its lands, built 21,740 feet of level terraces to catch and hold water and snow. It repaired 28,900 feet of gullies and controlled erosion on 7 miles of roads and 6 miles of trails.

Gravity has brought water to Star Valley, and water has brought with it a better life for Star Valley farmers.—RICHARD L. THOMPSON, *project coordinator, Western Wyoming RC&D Project, SCS, Kemmerer, Wyoming.* ♦

SCSA plans no-tillage conference

The Erosion and Sedimentation Division of the Soil Conservation Society of America is planning a national No-Tillage Conference to be held in Des Moines, Iowa, March 28-30, 1973.

The American Society of Agronomy, American Society of Agricultural Engineers, and the National Association of Conservation Districts have been invited to cooperate in sponsoring the conference and to name members to serve on the Program Committee.

Clarence S. Britt, USDA Agricultural Research Service, Beltsville, Md., is chairman of the Program Committee; W. H. Greiner, director, Iowa Department of Soil Conservation, Des Moines, Iowa, and Dr. W. C. Moldenhauer, USDA Agricultural Research Service, Ames, Iowa, are co-chairmen of the Arrangements Committee. ♦

Review

Summary Report, the Quiet Revolution in Land Use Control. By Fred Bosselman and David Callies. *1971. Council on Environmental Quality. 34 pp. $0.45.* Report and analysis of innovative land-use laws and programs developed in several states during the past decade. Discusses some of the broad issues in state land-use control. The 360-page parent document, *The Quiet Revolution in Land Use Control*, is available only from the Superintendent of Documents for $2.75 a copy.

Water Supply Sources for the Farmstead and Rural Home. *Rev. 1971. USDA Farmers' Bull. 2237. 18 pp., illus. $0.15.* Water-supply systems can be developed from ground-water sources such as wells and springs or from surface-water sources such as streams, lakes, ponds, and cisterns. This bulletin discusses various water-supply systems and gives guidelines for their development.

Rebuilding a Quality Environment Through Rural Environmental Assistance Program. *Rev. 1971. USDA Agricultural Stabilization and Conservation Service. 8-page folder, illus.* Successor to the Agricultural Conservation Program, REAP offers incentive cost-sharing assistance. Folder presents questions and answers describing the environmental situation in rural America and the change that the REAP program can bring about.

Soil Erosion, the Work of Uncontrolled Water. By R. D. Hockensmith and J. G. Steele. *Rev. 1971.* USDA Agr. Inf. Bull. 260. *16 pp., illus. $0.10.* Soil erosion by water can occur anywhere there is enough rain to cause runoff or where land is flooded by irrigation, snowmelt, or other causes. This publication describes the process of soil erosion by water—geologic erosion, sheet erosion, rill erosion, gully erosion—and discusses the conservation practices that can be used to combat erosion.

Invite Birds to Your Home, Conservation Plantings for the Midwest. By Wade H. Hamor. *1971. USDA PA-982. Color folder. $0.20.* Recommends cherry, wild plum, autumn olive, dogwood, mountain-ash, cotoneaster, Tatarian honeysuckle, Russian-olive, firethorn, sunflower, redcedar, bittersweet, crabapple, elderberry, American cranberrybush, holly, and hawthorn as the plants that can attract birds in the Midwest from Michigan and Indiana west to the Dakotas and Kansas.

Area Development Interchange. *Published by the National Area Development Institute, Spindletop Research Center (Lexington, Ky. 40501).* This new publication is "a national forum dedicated to development of rural areas, towns and smaller cities." Twice a month, in four to six pages, *Interchange* offers trend highlights, case studies, research findings, and reports on government programs and organizations in the field. Also offers special supplements on NADI conferences on key issues affecting area development.

Meetings

April

11–13 International Conference on Tropical and Subtropical Agriculture, Honolulu, Hawaii
15–20 American Society of Planning Officials, Detroit, Mich.
17–23 Earth Week '72
23–26 Association of American Geographers, Kansas City, Kans.
23–27 American Road Builders Association, New Orleans, La.
24–26 National Academy of Sciences, Washington, D.C.
30–May 4 Institute of Environmental Sciences, New York, N.Y.

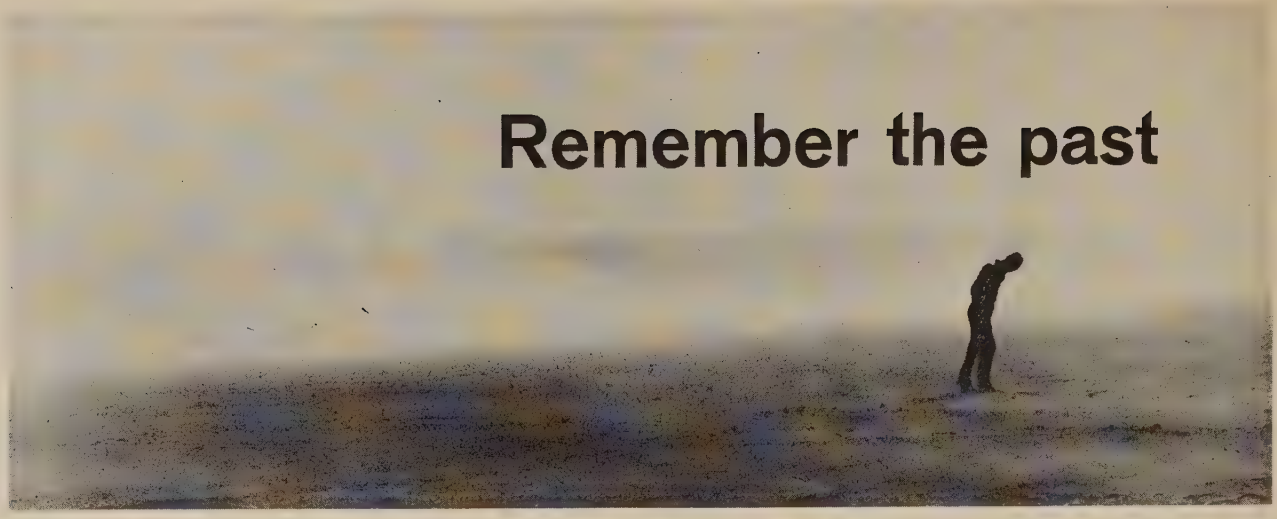
May

1–5 League of Women Voters of the U.S., Atlanta, Ga.
3–6 The Garden Clubs of America, St. Louis, Mo.
4 Forestry and Wildlife Forum, Virginia Polytechnic Institute, Blacksburg, Va.
4–5 Annual Southern Forestry Conference, Savannah, Ga.
7–11 The American Institute of Architects, Houston, Tex.
7–14 Soil Stewardship Week
12 Family Camping Federation, American Camping Congress, Chicago, Ill.
14–17 Annual Northeast Wildlife Conference, Allenville, N.Y.
14–18 National Council of State Garden Clubs, Inc., Cleveland, Ohio
17–June 3 International Commission on Irrigation and Drainage, Varna, Bulgaria
21–27 Urban Land Institute, 4th Annual Land Use Symposium, Toronto, Canada
23–25 Pollution Engineering and Equipment Exposition Conference, Chicago, Ill.
28–30 American Seed Trade Association, Portland, Oreg.

June

4–7 National Watershed Congress, San Diego, Calif.
5–16 United Nations Conference on the Human Environment, Stockholm, Sweden
8–12 General Federation of Women's Clubs, Denver, Colo.
13–18 American Water Works Association, Chicago, Ill.
14–16 Pollution Control Show and Conference, Toronto, Canada
18–22 Air Pollution Control Association, Miami Beach, Fla.
19–23 "Watershed Hydrology," National Symposium, Ft. Collins, Colo.
25–28 American Society of Landscape Architects, Philadelphia, Pa.
25–28 National Association of Counties, Washington, D.C.

Remember the past











—then look to the future.

Okay, let's hear it once again for the good old days of unspoiled beauty, when "seldom was heard a discouraging word and the skies were not cloudy all day."

Only some of us remember it a little differently.

We remember the thirties and gullies so deep that houses could fall in and still not fill the hole. Farms so wasted and eroded that families—whole towns—packed and left for some new Eden. Ranches so poor and parched that cattle starved by the hundreds for lack of food and water. Regions where the air was so dirty and hope so gone that in 1938 an angry Kansas wheat farmer wrote a book called *Empire of Dust* and dedicated it to "the vast multitudes of homeless men and women who, being haunted by famine, disease, and death, abandoned everything, through sheer desperation, in their bid for freedom from the everlasting dust menace."

This century, this country, this land and air and water.

Of course, the land should never have been so badly scarred in the first place. But the hopeful fact is that it did come back. Not all the way and not entirely. But much of this country's land today is better than it was 40 years ago—more productive, more attractive, better used and understood.

Who helped heal it, restore it? To a large degree, the farmers and ranchers, together with the scientists and professional conservationists who worked with them.

The Soil Conservation Service played a big part. We became a Service in April 1935—37 years ago this month. We look back with pride at those who preceded us in SCS and forward with a confidence based on our history, experience, and the results we have helped landowners obtain.

We continue to have problems today in the use of land and air and water, some old ones, some new. Urban sprawl. Suburban erosion. Burning dumps. Polluted streams. Unwise land use.

These are not insurmountable problems. Today's resource users—with governmental and other help—can do the job.

If they want to. If they know how. If they work hard.

It has been done before. Americans can look at the past and remember—then look to the future and work together on our common problems.

Kenneth E. Grant

Administrator

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Recon . . .

Land is not taxed in Great Britain. This enables farmers to continue farming in areas where economics would make it prohibitive in the United States. Property taxes in England are really a variant of income taxes in that the value of land is calculated as capitalized rental value less maintenance. If the property is vacant, it is not taxed.—*County News*, March 10, 1972.

"Removal of Nitrate by an Algal System" is the first in a series of reports on bio-engineering aspects of agricultural drainage, describing results of an interagency study of nitrogen and its removal from surface agricultural waste waters of the San Joaquin Valley. The report is available from the California Department of Water Resources in Sacramento, or Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Worthless wetlands? "Wetlands are the most versatile pieces of real estate on the face of this earth. They act as sponge, reservoir, filter, factory, nursery, and refuge. They can be a living laboratory, sewage plant, oxygen producer, heat sink, firebreak, erosion control agent, and recreational area."—ART HUTT, *Florida Wildlife*, October 1971.

An international organization called **International Water Resources Association (IWRA)** has recently been founded as a nongovernmental, nonprofit scientific organization. It was incorporated in Wisconsin and has its headquarters in Milwaukee. One of the major factors in establishing IWRA was the need for a society to provide an international forum for discussing all aspects of water-resources science and technology in an interdisciplinary manner. The establishment of IWRA is the result of the efforts of an international group of administrators, engineers, executives, and scientists representing many disciplines of the water-resources field. For further information concerning objectives or membership contact: Dr. G. M. Karadi, Secretary General of IWRA, University of Wisconsin, Milwaukee, Wis. 53201.

Heat of fusion. Midwestern strawberry and vegetable growers can protect crops against frost with irrigation. Extension agricultural engineers say that protection comes mainly from the water releasing heat as it changes to ice. This is called heat of fusion. Increased humidity in the air also reduces loss of heat by radiation from the crop and the soil.

Clean fuel. A feedlot producing 100,000 cattle annually produces 150,000 tons of dry organic waste. On the basis of 10 cubic feet per pound of waste, this could be converted by anaerobic digestion into at least 3 billion cubic feet of methane worth $510,000 to $990,000 and enough to supply the natural gas needs of 30,000 people at present rates of use.—HINRICH L. BOHN, *"A Clean New Gas," Environment*, December 1971.

Hail and farewell. Hail damages crops in every section of the world. The most severe storms occur during the growing season of crops. During the 1971 crop season, devastating losses were recorded in the 48 contiguous states, plus severe losses in many European countries including France, Spain, Switzerland, Austria, and Italy. Agriculturists have learned from many years of experience that one of the ways to deal with "Mother Nature's problem child" is to carry adequate crop-hail insurance.

Sweeperettes. The Retail Merchants Board of Cleveland, Ohio, dramatized the need for litter prevention by enlisting college girls to clear trash from a local shopping district.

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SOIL CONSERVATION
May 1972, Vol. 37, No. 10

What are you doing about the country's animal-waste problem? Animal-waste management systems are being sought that will make odor and water-pollution control possible without sacrificing efficiency and economy of operation.

This month in SOIL CONSERVATION, Charles E. Fogg discusses what SCS is doing in waste management. Other articles report the success of animal-waste disposal lagoons in Florida, Texas, and Alabama.

Another kind of environmental problem is discussed by Gordon Smith in his article about coal refuse piles.

COVER: No polluted water enters this serene stream in the Northern Panhandle Soil Conservation District, Marshall County, West Virginia. Photograph is by W. J. Melven.

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Helping dispose of animal wastes

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

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Waste management—nationally

by Charles E. Fogg
Sanitary engineer, SCS
Washington, D.C.



This debris basin was used to trap sediment during construction of a large shopping center in Fairfax County, Virginia. After the shopping center was completed and the area stabilized, the basin was removed.

We—conservation districts and the Soil Conservation Service—are in the pollution abatement business. We have been for more than 35 years.

We have not been calling our work—mainly, installing erosion- and water-control measures—pollution abatement. But it is. In terms of volume, sediment remains the single greatest pollutant reaching surface waters. It not only fills our streams and harbors and increases the cost of treating domestic water supplies, but also it carries nitrogen, phosphorus, and other nutrients that often contribute to accelerated eutrophication of surface waters. Reducing the volume of sediment that reaches surface waters is pollution abatement.

Our work in helping to reduce sediment is not limited to agricultural areas. Increased activity

in erosion control in urban areas is also bringing pollution abatement benefits.

Let's take a look at what we're doing across the country in waste management. We prefer the term "waste management" to "pollution abatement." It more clearly describes our efforts in recycling wastes and in keeping them from reaching surface or underground water. And let's remember that a waste is not a pollutant unless it degrades air, soil, or water. Many wastes are just resources out-of-place.

Management of livestock and poultry wastes is receiving increased attention. These wastes were not considered major pollution threats until production methods began concentrating more and more animals on fewer and fewer acres. Livestock and poultry manure when widely dispersed on open range or pasture is recycled naturally by the soil and plant cover. But the concentrated manure from hundreds of animal units per acre far exceeds the recycling capacity of that acre. That is why carefully planned waste-management systems are needed to assist nature.

In spite of rapid trends towards these new production methods, it is estimated that less than 20 percent of the 1.75 billion tons of manure produced by livestock and poultry operations can be considered a pollution threat. Probably less than 1 percent is actually polluting surface or ground water.

Basic concepts of animal-waste management are essentially the same throughout the United States, Puerto Rico, and the Virgin Islands:

(1) Divert clean water away from concentrated production areas to prevent its pollution;

(2) Grade the production area to improve drainage and promote drying;

(3) Collect contaminated runoff;

(4) Evaporate or recycle contaminated runoff to the land and its plant cover;

(5) Collect and store manure solids and liquid manure from confined livestock and poultry operations until they can be safely spread on the land.

Waste-management techniques vary widely across the country.

In arid areas, the liquid part of wastes is readily evaporated, and the solid part is greatly reduced in volume right on the lot. Odor and absorption of ammonia by surface waters are often side problems.

In warm, humid areas, lagoons can effectively degrade wastes and reduce the volume to be recycled. Effluent from the lagoons generally should not be discharged directly into streams.

In cold, humid areas, waste-management systems generally include extensive holding facilities—ponds, pits, or tanks—to store wastes when the ground is frozen or snow covered and vegetation cannot utilize the waste nutrients.

Nearby residential or urban developments must be considered in selecting a waste-management system for any livestock or poultry enterprise. Animal wastes may only *smell* to farm owners or operators, but they *stink* to downwind neighbors. The use of anaerobic lagoons or the spreading of stored liquid manure on the land may not be feasible because of odors. Aerobic treatment, transporting the manure for spreading elsewhere, or other alternatives may be very costly.

Problems associated with waste management near urban areas can be varied and unpredictable. Take, for example, the modern dairy farmer near a residential area serving a large city. He employed the latest equipment and technology to handle his liquid manure—a completely enclosed storage tank having a 4- or 5-month capacity, an agitator, pumps, liquid manure spreader. He studied weather forecasts, wind direction, humidity. He carried out an extensive public relations program, informing neighbors of his waste-management system and his concern for the environment. When everything was just right he spread the waste on selected fields downwind from neighbors. That evening a neighbor complained. The neighbor's dog, much to the farmer's dismay, had found that a field spread with liquid manure was an excellent place to roll and romp before going back to his nicely carpeted home.

SCS, through conservation districts, assists industries and communities and their consultants in recycling to the land and its plant cover effluent and sludge from waste-treatment plants. Conventional primary and secondary waste-treatment plants do not remove a high percentage of the nutrients contained in wastes. Excess nitrogen and phosphorus are blamed for accelerating the process of eutrophication in surface waters. Where eutrophication of receiving waters is a problem, many communities are installing tertiary treatment facilities for removing nutrients from wastes. One method of tertiary treatment, gaining in popularity, is applying effluent from a secondary waste-treatment plant on the land. This method is not a panacea but is worth considering where sufficient land is available and the soils are suitable.

Basic to recycling wastes to the land are:

(1) Capability of soils to safely assimilate wastes;

(2) Ability of selected vegetation to utilize nutrients;

(3) Knowledge of limiting amounts of waste components that can safely be applied.

We assist industries, communities, and individuals planning to recycle wastes to the land by providing soil surveys and infor-



mation regarding: site selection, soil and plant limitations, liquid waste application rates and management, and site protection.

System design and compliance with appropriate health and water-quality regulations remain the responsibility of each industry or community and its consultant.

We also assist communities and their consultants in planning sanitary landfills. Our soil surveys and interpretations are useful in selecting from many potential sites those few warranting detailed investigation. This can save many dollars by eliminating the cost of investigating poor sites. And our recommendations on erosion- and water-control measures can be helpful in site development, including protection from runoff and wind erosion as well as vegetation for screening and site protection.

Soil surveys do not take the place of detailed geologic investigations for determining groundwater depth; quality, volume, and direction of flow; depth to bedrock; and quantity of material available for landfill operations.

Detailed engineering design is required to give proper consideration to volume and types of trash to be handled, collection routes, access, traffic patterns, neighborhoods, zoning, deposit regulations, leachate problems and possible treatment, availability of utilities, fire control, and after-use of the sanitary landfill site. Once again, design and compliance with regulations remain the responsibility of the community and its consultant.

The foregoing are some of the ways in which conservation districts and SCS are presently involved in waste management across the country. We must prepare ourselves for a more active role in these and many other areas of environmental quality improvement in the years ahead. ♦





(Top) In a trench type sanitary landfill, like this one near Ada, Oklahoma, refuse is compacted and covered daily with a layer of soil.
(Center) This pond collects polluted runoff from a modern, paved beef feedlot in Cass County, Michigan. The runoff in the pond is recycled, by irrigation, to cropland. Solid manure is scraped from the feedlot and spread on the land.
(Bottom) This lagoon in Russellville, Arkansas, was built to treat poultry processing wastes. Three of six aerators are shown.

Producing without polluting

by James N. Krider
Assistant state conservation engineer, SCS
Gainesville, Florida

It was 1970 when get-tough pollution-control legislation began to emerge in Florida. In the agricultural sector, this new legislation posed the greatest threat to the dairy industry. But the positive response of Florida dairymen has put them in the forefront among all industries in leading the way to compliance.

P. L. Synder, owner of the Sunnyhill Dairy near DeLeon Springs in Volusia County, was one of the pioneers in a program that stresses "being good neighbors with the environment."

"Early in 1970, the alternatives were not too desirable," says Snyder. "Most of the talk was about the kind of sewage treatment used by municipalities. Those systems are costly to build and to operate. Dairymen had to find less costly facilities or face the prospect of going out of business."

Snyder, long a cooperator with the Volusia Conservation District, learned about a new approach to animal-waste treatment—the lagoon system—through the district. He and his dairy manager, Alvin Gephart, decided that when design criteria became available the Sunnyhill Dairy would be one of the first in Florida to try the lagoons.

The dairy's adequate land area, soils, topography, and grassland



management program made it easier for the Soil Conservation Service to design the waste-treatment system.

The 484 acres range from level to gently rolling hills; the soils are sandy to sandy loam. The principal grass crop is Pensacola bahiagrass, which is overseeded with ryegrass for winter grazing. One thousand cows are held on nearby pastures between twice-a-day milkings. More than 78,000 gallons of water are used each day for washing the cows before each milking and cleaning the cow-holding areas after milking.

Snyder's waste-treatment system consists of three separate measures: an anaerobic lagoon, a holding lagoon, and a system for distributing the effluent on the land.

Wash water and its waste load are flushed through a low-velocity open ditch and dropped through a corrugated metal pipe into the anaerobic lagoon. There it takes 15 days for the biological reduction of solids. Tests have shown that this treatment provides as much as a 90 percent reduction in biochemical oxygen demand. Snyder's lagoon is 535 feet long, 100 feet wide, and 15 feet deep, which is adequate for his milking herd.

In the second stage, gravity pulls the effluent through a corrugated metal pipe into the holding pond where it is held for 7 days. Further treatment does take place in this pond, but the pond serves primarily as a storage basin for water that cannot be disposed of during periods of excess rainfall. It also helps to avoid continuous overflow.



Al Gephart, Sunnyhill's manager, looks over the sprinkler system which irrigates 44 acres of bahiagrass pasture.

(Opposite page) Sunnyhill Dairy's waste-treatment system consists of three separate measures: an anaerobic lagoon, bottom left; a holding lagoon, top right; and a sprinkler system to distribute the effluent on the adjacent land.

The final step in the treatment process is a modern adaptation of the age-old practice of applying manure to the land as fertilizer. Although wastes in the detention basin have essentially been degraded, the effluent contains substantial quantities of plant nutrients. Gephart's objective is to dispose of the animal wastes, but he recognizes the benefits from the supplemental plant nutrients.

A pump and diesel power unit were installed to get the effluent from the detention pond to 44 acres of bahiagrass pasture, subdivided to allow for rotating the applications.

The effluent is pumped to the pasture through a pipeline along which are located a series of portable lateral lines at 100-foot intervals. Each lateral line has impact-type sprinklers along its length. Gephart operates two laterals at a time for 4 hours, then activates two other laterals on the same side of the pipeline for a similar period. This process is continued on one side of the pipeline until half the field is irrigated. The lines are then moved to the other side of the pipeline, and irrigation continues for the other half of the field. The effluent is supplemented from a nearby 10-inch well to provide sufficient irrigation water.

To date, 67 lagoon waste-treatment systems, serving more than 42,000 dairy cows, have been installed on dairy farms in the state. The largest system serves a herd of 1,950 cows. With an estimated 271,000 dairy cows in Florida, a sizable job remains to be done. But with people like Snyder and Gephart, who are willing to be innovative, the job will be an easier one. ♦

Land grading: a pollution stopper



by James Martin
Area engineer, SCS
Crowley, Louisiana

Most cane farmers in Louisiana know that land grading puts dollars in their pockets, but few realize that it puts quality into the environment.

Stan Rodrigue, manager of Goldmine Plantation in St. John Parish, a long-time cooperator with the Crescent Soil and Water Conservation District, and an ASC county committeeman, helped pioneer land grading in Louisiana's cane area. He graded the first area on Goldmine in 1963 and since then has graded 447 of the plantation's 900 cropping acres. "We plan to have all of the cropland graded," he said, "as weather, equipment, and open land permit."

Land grading on the Goldmine Plantation has reduced erosion and kept pollution-causing sediment out of water areas. Some slopes have been reduced, and ditches and water overfalls have been eliminated. Grade stabilization structures are used on graded land to keep soil from "eating back."

Grading has cut down the amount of herbicides needed to control johnsongrass on Goldmine. Before land grading, 2 of every 20 acres were breeding grounds for johnsongrass because of ditches or headlands. And when ditches were cleaned out the johnsongrass rhizomes and seeds scattered into the fields. Now, after land grading, ditches or headlands are found only on half an acre out of 20. The land formerly in ditches is now cultivated.

Five miles of lateral V-ditches will replace about 56 miles of split ditches, cross ditches, and main ditches. In the V-ditches, johnsongrass is kept under control by close clipping and spot spraying if needed.

By eliminating the split ditches, the johnsongrass seed spots have been reduced, and consequently there is less johnsongrass in the

fields. "Before land grading," says Rodrigue, "we had to apply chemicals on the entire field to keep the grass under control. Now, spot spraying will do it."

Until a few years ago split ditches were the only drainage system used in Louisiana's cane area. Split ditches kept 5 to 15 percent of a canefield out of cultivation. But land grading has changed that.

Erosion occurs with the use of split ditches, partly because of the overfalls where shallow quarter-drains in the fields empty into the deeper split ditches. There are about 30 of these overfalls on a 20-acre plot. Also, the steep side slopes of split ditches erode and often cave in.





(Opposite page) Land grading in Louisiana's sugarcane area has resulted in better drainage and less erosion.
(Above) Lateral V-ditches like this are replacing about 56 miles of split ditches, cross ditches, and main ditches on the Goldmine Plantation.
(Left) Land grading is eliminating split ditches like this. The steep side slopes of the ditches erode and often cave in. Generally, there is a heavy growth of johnsongrass along each side of the ditches, and the rhizomes and seed infest the adjoining fields.

The Soil Conservation Service has assisted Rodrigue and other cane farmers in planning drainage and water-control systems and in laying out grading work.

"Land grading has helped greatly to reduce the silt originating on the Goldmine Plantation," comments Rodrigue. "But we're still not where we want to be. As more and more land is graded, there will be less silt to pollute our streams and less chemicals on our fields to control johnsongrass." ♦

Instant landfill

getting rid of trash for 20 cents a year

by John M. Cross
Information specialist, SCS
Lincoln, Nebraska





WHAT A DUMP! Warren Rice, left, Merwin Fricke, center, and Jim Eriksen are inspecting the sanitary landfill established in abandoned gravel pits on the Fricke farm. (Opposite page) The area around the gravel pits was protected by native grasses, but the pits had been a source of sediment.

Adams County, Nebraska, has a sanitary landfill. People outside Hastings have a place to dump their trash. Merwin Fricke is getting rid of some old gravel pits. Thirty-Two Mile Creek watershed is losing a source of sediment. All of this is taking place at the same time.

There are 30,000 people in Adams County; 24,000 of them live in Hastings. Hastings has its own solid-waste disposal system, but five other small towns in the county and the people in rural areas have had no way to dispose of trash. An open dump near the town of Holstein needed to be closed, for a number of reasons.

Dumping of trash along roadsides and in streams was a problem that Adams County supervisors were under pressure to solve. So when they heard that directors of the Thirty-Two Mile Creek Watershed Project bought a 160-acre farm on which to build a flood-control structure, they asked to locate a sanitary landfill on the same property.

There were a lot of good reasons why the watershed project directors didn't want a landfill near a flood-control structure, but they didn't want to just say no and drop the matter. After all, some of the objectives of the watershed project—clean environment and natural beauty—were the same as those of the county government. But the land for the structure had been bought with state loan funds and would be sold in 5 years. And wildlife plantings and native grass seedings on the land might suffer.

Warren Rice, manager of the



Adams Soil and Water Conservation District, decided to look around for a site to offer as an alternative. Knowing that Merwin Fricke, a director of the Thirty-Two Mile Creek Watershed Project, wanted his old gravel pits filled, Rice saw this as an opportunity for satisfying two needs.

The oldest of these pits had not been worked for 40 years. The other was active 20 years ago, and both were eyesores. They were adding to the sediment going into nearby Thirty-Two Mile Creek. The land around the pits had been seeded to native grasses in 1967, under Fricke's Great Plains Conservation Program contract, and that land was tied down. But the pits were a problem.

Surveys made by the Soil Conservation Service indicated that Fricke's pits had a capacity for about 20 years of use as a landfill. SCS district conservationist Jim Eriksen checked the soils, the amount of fill material needed, and the requirements for reseeding to grass.

So, for a fee of $1 for 5 years, Adams County supervisors have leased Fricke's old gravel pits. They have agreed to maintain health standards and to seed the completed fills to grass. Two days a week, Wednesdays and Sundays, anyone in the county outside of Hastings can bring their refuse to the only sanitary landfill in Adams County.

The county keeps a dozer and operator at the landfill when it is open. The area has been fenced, and a locked gate controls access when the landfill is closed.

In 1971 Fricke Farms, Inc., won the Honor Farm award presented by the Adams Soil and Water Conservation District for outstanding conservation accomplishments. Getting rid of the gravel pits somehow seems to be a final touch in land use, preceded by such practices as wildlife habitat plantings, grass seedings, ponds, diversions, and irrigation systems. Agreeing to provide the county with a landfill for 20¢ a year goes along with Fricke's other public spirited activity.

Fricke's father sold gravel from those pits 30 years ago. Fricke will sell beef from them someday. Meanwhile a lot of tin cans, paper, and other solid wastes will be covered forever by bluestem sod. And Thirty-Two Mile Creek will be a little cleaner. ♦

The waste production from livestock and poultry in the United States is equal to that of a human population of 1.9 billion. A number of complex waste management systems are feasible. In Alabama, a concerted effort to solve the animal-waste problem through disposal lagoons is having promising results.♦

Water-cure for wastes

by Vincent J. Price
Information Division, SCS
Washington, D.C.

S. L. Cooke, on the right, a farmer in Marshall County shown here talking to district conservationist Byron Oliver, had hog problems a few years ago.



One hog produces about 1½ tons of solid and liquid wastes a year. With a hog operation the size of Cooke's, the waste-disposal problem seemed monumental. One solution . . .



An SCS-designed lagoon. This 185,452 cubic-foot, $1,400 lagoon can adequately dispose of the wastes produced by Cooke's hogs. The banks of the lagoon are lined with bermudagrass. There is an overload spillway, but it has not been needed; there is no odor problem. The hoghouse is built out over the lagoon for easy waste disposal.





The P. G. Cowden dairy farm in Blount County also had a waste-disposal problem. And a proposed expansion of livestock operations to 200 cows would surely increase it.



Now animal wastes are taken care of by this 8-inch clay pipe. The wastes are diverted into the pipe and empty into . . .



This SCS-designed lagoon. The lagoon measures 75 feet by 15 feet by 8 feet and contains 65,296 cubic-feet of water—300 cubic-feet per animal plus a safety margin. The $1,238 cost of materials and earthmoving was shared by Cowden and the Rural Environmental Assistance Program.



Even a small livestock farm can use a disposal lagoon. Lavoid Gullion's sow-and-pig operation involved 20 animals; yet the waste problem was large enough to prompt the Marshall County farmer to install this lagoon which is connected to the hoghouse by a disposal pipe. Kentucky 31 tall fescue lines the lagoon banks.



Coal mining company builds

New land from coal refuse

by Gordon S. Smith
Public information specialist, SCS
Upper Darby, Pennsylvania

In the hills of West Virginia, where a level piece of land sells for a premium price, a new method of forming coal refuse piles holds a promise of turning this land-use problem into useful real estate.

Instead of maintaining an eroding eyesore, Idamay Coal Mine No. 44, in Marion County, has stabilized a one-time refuse pile with grass and trees. A new plastics industry has located on 8 acres of the pile's 60-acre flattop.

Refuse piles—the mountains of slate, shale, and sandstone separated from the deep-mined coal—have been unsightly trademarks of the coal industry for years. In past decades, waste material was trucked to nearby dumping sites. Over a period of years, a refuse pile grew, often as high as the surrounding hills. Rain hitting the raw slopes washed the loose material into the stream below. Spontaneous combustion often set the refuse afire deep inside the piles, sending foul-smelling smoke across the landscape. Rust-red, acid mine water often seeped from the piles to further pollute the streams. Sometimes a massive wet refuse pile would slip and separate causing added problems.

Thanks to the resourceful ingenuity of some mine operators, refuse piles have begun to take on a new look. A few piles are being formed in a way that ends pollution hazards of the past and improves the value of the land.

Idamay Mine No. 44, operated by Bethlehem Mines Corporation, a subsidiary of Bethlehem Steel Corporation, first tackled the problem. Today the company owns more than 100 acres of land that was formed from a refuse pile. Sixty of these acres are leveled and revegetated land.

The mine's land-improvement effort started about 6 years ago when Beryl Toothman, outside foreman of the Idamay mine, discussed the problem with Law Helmick, SCS district conservationist in Marion County. As a cooperator with the Monongahela Soil Conservation District, the mining company had received technical planning aid from Helmick in the past.

Helmick drew up a plan, which Toothman put into action after approval from Bethlehem Mines' officials.

On the site for a new refuse pile, 150 feet of hillside was

(Above) Coal refuse is dumped here and spread out and leveled. When a layer is 15 feet deep it is covered with an 18-inch layer of soil. An uncontrolled, older refuse pile is in the background.
(Right) A cover of switchgrass and 'Alta' fescue provides excellent protection for the refuse pile.
(Right, bottom) Thousands of trees dot the top of this conservation planned refuse pile. The trees and grass block erosion and hold the refuse in place.

shaved off to provide some needed earthfill and to form a better anchor for the mine refuse. A bulldozer spread the mine refuse, making an even, 15-foot-thick layer. This was topped with an 18-inch layer of soil. The operation was repeated—layers of refuse alternating with earthfill. The sides of the pile were sloped to fit the natural contour of the surrounding landscape and covered with soil. As the pile grew upward, the slopes were protected with a seeding of switchgrass, 'Alta' fescue, perennial ryegrass, and yucca. A hydromulcher spread a mixture of paper pulp, fertilizer, and water as a base for the seeding.

When the refuse pile reached a height of 80 feet above the base, the top was covered with soil and seeded.



Plant materials for the initial field trials were provided by an SCS plant materials center. Under a Monongahela Soil Conservation District contract, approximately 4,000 trees were planted on the slopes of the pile. Bristly locust, European alder, speckled alder, and mountain-ash were used in a survival test. Crownvetch also was planted as part of the experiment to find suitable plants for the site. Later, 5,000 white pine, 5,000 Virginia pine, and 2,000 black locust trees were planted.

In addition to the district contract plantings, the coal company planted more than 4,000 Virginia pine, locust, European black alder, and autumn olive.

Most of the trees and grass have survived to form a protective cover over the flattopped refuse pile.

Helmick's plan included a desilting basin at the base of the pile. Mine sludge, made up of fine refuse particles, is pumped into the basin from the coal preparation plant. When the basin fills completely with solid refuse, it will be covered with a layer of soil, becoming a useful area of level land.

In summing up, Helmick says, "Approximately 75 acres of the mine refuse dump are now covered with trees. An additional 60 acres have a good stand of grass. The layers of soil stabilize the pile, smother possible spontaneous combustion, and cut off seepage at the bottom of the pile.

"With an improved road leading into the area, the site is ideal for the new plastics company, which is bringing new employment to this community. We hope other industries will consider this site."

Asked about the cost of the refuse pile improvement project, Beryl Toothman replied, "We consider it part of the normal upkeep of the mine operation. Actual costs of improving the pile will be regained from the increased value of that land."

With minor variations, the refuse pile improvement practice is being followed by other deep-mining companies in West Virginia, Pennsylvania, Ohio, and Kentucky. The practice is considered a sound investment in natural resource management and a solution to many pollution problems.

The useless refuse piles of the past may someday be replaced by acres of useful land. ♦





Where's the dust?

by Stanley T. Moorhead
Project engineer, SCS
Santa Rosa, California

In 1969, people watching channel construction along Santa Rosa Creek in northern California nearly choked in talclike dust.

In 1970 and 1971, as work progressed on the Central Sonoma (Public Law 566) project, people breathed freely and had a clear view of channel construction along Santa Rosa Creek and Ducker Creek.

Where did the dust go?

Mud in winter and dust in summer seemingly are inevitable on construction sites. When large



earthmovers, huge crawler tractors, and big trucks—the whole panoply of modern construction—descend on an area and begin work, mud immediately gets tracked around or dust begins to rise.

How much dust is too much? It's hard to keep dust at an acceptable level when there isn't a way to measure it. Only when dust fallout can be measured accurately will the contractor be able to control dust pollution.

During the 1969 construction season, residents of the Santa Rosa Creek area had to endure a plague of dust. Swimming pools had to be cleaned daily. Clothes freshly laundered and hung out to dry had to be washed over again. Twice-a-day housecleaning and gritty food became commonplace. Not hard to see why there were complaints!

In 1969, the Sonoma County Water Agency and the Soil Conservation Service worked with the San Francisco Bay Area Pollution Control District in developing specifications and equipment to measure dust arising from construction work and in setting dust tolerances. Dust-pollution tolerance was set at 2 grams per square meter per day, including the half-a-gram background amount. Two grams per day were considered tolerable, though on the high side; future tolerance levels probably will be lower.

Equipment was available for taking standard monthly, jar-sample measurements of dustfall but not for taking daily samples needed to measure accurately the dust raised during construction.

The agencies determined that a flat pan, lined with plastic film, could collect the dust when properly protected from wind. A protector box and stand were developed, and the measurement methods that had been worked out showed accurately the amount of dust collected daily. The daily samples checked out well against the monthly samples.

When the Blasi-Engleke Company began work on Santa Rosa Creek in the spring of 1970, dust-pollution tolerances were written into the contract.

Where did the dust go? The dust didn't go anywhere, of course. It was kept in place by good construction practices.

Thanks to agency-contractor cooperation, at least a few Santa Rosa residents are no longer under a cloud of dust. ♦



Ray Morton, an SCS inspector, exhibits a "dust collector," used for taking daily samples needed to measure the dust raised at a construction site.

(Opposite page, top) A cloud of dust rises from construction work along Ducker Creek.

(Opposite page, bottom) No dust here where good construction practices are being followed and dust-tolerance levels have been set.

conservation in action

Zero runoff into Texas streams

In Texas, Soil Conservation Service engineers who are designing feedlot pollution abatement systems have a lofty goal: zero runoff into Texas streams.

The Texas Water Quality Board has permit and registration requirements for operators of dairy, swine, and cattle feedlots. SCS has been asked to provide engineering assistance on 159 feedlots. To date, plans are complete on 78 feedlots and are in various stages of design on the remaining 81.

To find out how feedlot pollution abatement systems are working in Texas, I talked to Barry Moore, co-owner and operator of a feedlot at Hamlin.

"Our system was designed to comply with requirements set up by the Texas Water Quality Board," Moore said. "The board started regulating feedlots early in 1970, but we had been concerned about pollution long before that. We think keeping feedlot runoff under control is part of being a good neighbor. We wouldn't want someone else's waste water draining onto our land, and we don't intend to allow polluted water from our feedlot to drain onto a neighbor's land."

Moore pointed out that the 2,800-head cattle feedlot was built with runoff control in mind. The feedlot is on the brow of a hill, so there is no outside water entering the area.

A diversion terrace below the feedlot collects the runoff and empties it into one of two holding pits. The two pits can store more than 6 inches of runoff. Their capacity of 8.4 acre-feet is expected to handle all the runoff that might occur during the heaviest 24-hour rain that can be expected once every 25 years.

The water is pumped out of the pits and is used to irrigate adjacent land that has been leveled, bordered, and established to coastal bermudagrass. Also, pipeline from the pits carries water over a hill where additional bermudagrass can be irrigated as needed to help keep the pits empty. Nearly 20 acres in all can be irrigated, an area slightly larger than the feedlot.

Moore's conservation plan, worked out with the help of Pat Henson of the Anson SCS office and the California Creek Soil and Water Conservation District, calls for the parallel terracing this year of 140 acres of cropland adjacent to the feedlot. Eventually, most of the 600-acre farm will have parallel, level terraces with blocked ends. The terraces will be built from the back side, thus making the land between the terraces almost level. Henson estimates that on such land no runoff will occur from an 8-inch rain. Manure from the feedlot will be spread on this semileveled waste-disposal area.

A waterway has been built at one end of the farm to keep out-

On this feedlot near Hamlin, Texas, polluted water runs into a diversion terrace below the feedlot and empties into the holding ponds on the left. The water is used to irrigate the adjacent pasture, which has been leveled and bordered.



side water from entering a field to be irrigated from the holding ponds.

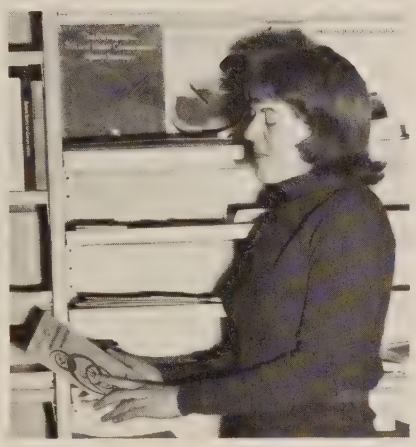
"Frankly, I don't know what I'd have done if it hadn't been for SCS help," admits Moore. "Henson called in the area engineer, Bob Gray from Abilene, and the two of them helped me draw up my plan. After we completed the engineering designs and plans, getting my permit from the Texas Water Quality Board was fairly simple."

Moore received cost-share assistance for the waterway, the diversion terrace, the two holding pits, and the land leveling through the Rural Environmental Assistance Program administered by the Agricultural Stabilization and Conservation Service.

Moore's feedlot has been operating at near capacity ever since he started accepting cattle early in 1971. His pollution abatement system keeps his feedlot wastes and runoff at home and helps make him a "good neighbor." —DALE D. ALLEN, *Public information officer, SCS, Temple, Tex.* ♦

Environmental information center

The crusade for a better environment ushered in a massive demand for information about air, water, soil, woodland, and wildlife. Conservation agencies are being pressed for speakers, films, and publications by schools, civic groups, garden clubs, and the general public. To help narrow this information gap, Pennsylvania's Westmoreland County Conservation District set up an Environmental Information Center in a room adjoining the district's office in Greensburg. The center is manned entirely by volunteers.



Mrs. Carol Pollock, volunteer director of Westmoreland County's Environmental Information Center.

There is a great deal of interest in the center, Mrs. Carol Pollock, who directs it, will tell you. "This is the first such center in the area. It has been open less than a year, and already we have had to extend our hours from the usual 8:30 a.m. to 4:30 p.m. to several evenings a week and Saturday to better serve our county's students. In addition to the students who come in, call, or write, we serve about 200 other people a month including elementary, secondary, and college teachers; sportsmen, farmers, homemakers, Scout groups, and civic clubs. We like to feel that we are a catalyst for people and their environmental problems," emphasizes Mrs. Pollock, who also helps her husband John operate a farm near Latrobe.

The center is well stocked with hundreds of publications with information ranging from ways to invite birds to your home to tips on selecting soils for house sites or commercial areas. The latest books on ecology, slide sets, and films are available on a loan basis to residents of the county, who have most of the environmental problems associated with a rapidly developing community.

A very popular publication is the *Directory of Environmental Information*, a 40-page booklet that was the 5-year dream of Mrs. Ann Saxman, associate director of the conservation district and an enthusiastic conservationist. Mrs. Saxman realized her dream with the help of more than 50 volunteers and with funds provided by the district and a Latrobe industrial firm. The booklet covers every aspect of environmental problems and includes the names, addresses, and telephone numbers of organizations and agencies that can help solve the problems. It raises questions about ecological conditions in the county and challenges the reader to research the problems by using the pertinent references listed in the directory.

The financial support for the center comes from public donations and from the county government. "Our largest donation

has been $100," says Mrs. Pollock. "We know that public support for the center will continue to grow as more and more people become acquainted with the services available."—CHARLES SLATON, *public information officer, SCS, Harrisburg, Pennsylvania.* ♦

Giving nature a helping hand

Hunters in Lancaster County are in for more fun and sport as the Pennsylvania Game Commission speeds up its wildlife habitat improvement program in the area. Bird watchers, hikers, and other lovers of the outdoors can also benefit.

The Soil Conservation Service has worked with the Pennsylvania Game Commission in developing conservation and management plans for three state game lands in the county. These lands, managed by William A. Griffie of the game commission, cover about 2,500 acres. The plans were developed during the winter of 1970 and the spring of 1971.

Griffie will use the conservation and management plans for scheduling habitat improvement work, planning equipment needs and personnel assignments, and in preparing a record of accomplishments on each game land. He also believes that division offices of the Pennsylvania Game Commission will be able to use the plans for budgetary purposes. Division personnel will know what habitat improvement work is planned for the coming year and then can establish costs and set priorities to accomplish the planned improvements.

One of the state game lands in the county, covering 96 acres, is managed primarily for pheasants and rabbits. Sixty-six acres are in cropland, laid out in contour strips with 17,500 feet of wildlife borders planted around the fields and along many of the contour strip boundaries. Additional parking has been provided in this area for visiting hunters and nature lovers.



On this state game land 1 mile north of Reinholds, Pa., wildlife borders have been planted along the edges of the contour strips.

The second game land, covering 2,285 acres of steep and rocky woodland, is managed for grouse, rabbit, squirrel, and deer. People who enjoy snowmobiling will have access to 7 miles of road marked and designated for this purpose. Game commission personnel have established 7,000 feet of cutback border; 134,000 additional feet are planned. Critical-area planting to benefit wildlife is planned for 17 acres, and grasses and legumes are to be established on 49 acres.

The third state game land is a 92-acre area of steep, wooded land managed for squirrel, rabbits, and deer. About 11,000 feet of cutback borders make up most of the planned improvements; part of these are already established. About 5,000 feet of access roads and 2,800 feet of recreation trails also are planned. A small parking area and 2 acres of critical-area planting make up the remainder of the planned improvements.

Pennsylvania cares about its wildlife resources and is cooperating with other state and federal agencies to preserve or improve them not only for sportsmen—and sportswomen—but for all the people that love nature and the outdoors. The fact that the state game lands are getting better proves this.—B. FRANK LUCAS, *soil conservationist, SCS, Lancaster, Pennsylvania.* ♦

Recon . . .

The guest who came to dinner and settled down for good is still a pretty fair story—if the "guest" is a herd of buffalo and the dinner is 5,000 feet above sea level in Hawaii's Ka'u Soil and Water Conservation District. As part of an experiment to find a good use for a highland section of flatland on the cooperating Kahuku Ranch, the buffalo were airshipped from South Dakota 3 years ago. They've since been joined by other "guests"—mouflon mountain sheep, wild turkeys, and Chinese ringneck pheasants—in an effort that combines soil conservation, wildlife, and recreation values.

Unmanaged wild areas evolve plant communities unsuitable for elk, deer, and some other species, according to data gathered by wildlife biologists in Idaho. In the past, good elk range was created by wild fires that interrupted natural plant succession from shrubs and grasses to forest. These prime food items, vital for winter forage, are gradually crowded out by evergreen and other trees which are low in nutrients and develop under modern fire protection. Prescribed burning—not as yet permitted in wilderness areas—may be a way of helping to reverse the trend.

Orders from the White House. The poisoning of eagles, hawks, coyotes, falcons, and other predators on federal land has been banned by executive order, and the Departments of Agriculture, Defense, and Interior, and the Tennessee Valley Authority have been directed to regulate the use of snowmobiles and other off-road vehicles on federal lands.

Dry winter. A new housing complex was built for the Tachi Indians of Kings County, California, several years ago. Because the town was flooding every winter, SCS engineers were asked to design a drainage system for the town. Last winter, with only part of the system constructed, the town was free of floodwater. The Tachis anticipate completion of the drainage system this year.

The Pennsylvania Game Commission and private industry have joined in launching a pilot project to make more privately owned land available for public hunting. The project, called the Forest Wildlife Cooperative Program, will be similar to the Game Commission's Farm Game Cooperative Program, which opened nearly 2 million acres of private agricultural land to sport hunting. The Game Commission will provide an additional degree of protection to large forested tracts made available by owners for public hunting. Certain roads into or across the tracts will be closed to public usage and posted with Game Commission signs. The responsibility for enforcement of regulations governing the posted roads rests with the Game Commission.

Clear the air. To reduce air pollution the Florida Department of Pollution Control has established specific rules relating to open burning and frost-protection fires in citrus-growing areas. The Division of Forestry is responsible for authorizing virtually all open burning in rural areas. Burning cannot be allowed if it will pose a potential threat to human life; weather will be the determining factor when requests for night burning are made; and the Division of Forestry must be notified and consulted before any burning operations to clear land are made in a rural area or adjacent to or near forests, grass, woods, wild lands, or marshes.

Save that tree. California's East Bay Regional Park District is recycling planks from redwood picnic table tops that have been deeply carved by picnickers. About three-sixteenths of an inch is planed off the table planks in recycling them for further use. The cost is $1 a board plus $60 for the purchase of planer blades for refinishing the planks. The life of the tables has been extended by as much as 10 years, and the saving itself is estimated at $1,200 a year.

Junior board of supervisors. Through a program originated by the National Association of Conservation Districts, members of youth groups can participate in environmental control. Serving on junior boards in their local soil and water conservation districts, these young people help develop useful ecology programs. Future Farmers of America members serve as the core on many of the junior boards. They work with representatives from Boy Scouts, Girl Scouts, Campfire Girls, Boys' Clubs of America, Future Homemakers, Young Men's and Young Women's Christian Associations, the Audubon Junior Program, and other youth organizations.

No-till pays. The 1970-71 Cooperative Extension Service progress reports indicate that each year more acres of corn, soybeans, sorghums, and other crops are produced either by the no-tillage or minimum tillage systems of crop production. These systems reduce soil erosion, cut labor and production costs, and save needed soil moisture. Arkansas, Iowa, Kentucky, Maryland, North Carolina, South Carolina, Tennessee, and Virginia report big increases in no-tillage or minimum tillage acreage.

Review

Engineering Formulas. By Kurt Gieck. *1972. McGraw-Hill Book Company, New York, N.Y. 384 pp., illus. $8.50*

Engineering Formulas offers a pocket-size guide providing engineers and scientists with important technical and mathematical formulas in a brief, clear, and handy format. Included are tables of measurements, areas, solid bodies, trigonometry, analytical geometry, special functions, differential calculus, and statistics. Also provided are formulas of kinematics, dynamics, hydraulics, head strength, machine parts, electrical engineering, optics, and chemistry.

Containing more than 1,500 formulas and about 300 diagrams, the book is printed on one side of its pages only, providing ample space on facing pages for additional notes.

Bark Mulch: Natural Artistry Around Your House. *1972. USDA Forest Service NE-INF-11. [20] pp., illus. in color.* Suggests ways of using forest tree bark mulch on flower beds, around trees and shrubs, on walkways, in playgrounds—anywhere that nature's versatile material can be put to work.

All Around You, an Environmental Study Guide. *1971. U.S. Dept. of the Interior, Bureau of Land Management. 126 pp., illus. $1.50.* For small children, this publication introduces environmental awareness through experiments in seeing, feeling, smelling, hearing, and tasting; for more advanced students, it relates environmental studies to civics studies. It includes study units that can be applied in the schoolyard, the student's own backyard, or in any available outdoor area. Urban as well as rural outdoor settings are covered.

Wildlife for Tomorrow. By Donald H. Wolfe. *1972. USDA Program Aid 989. 28 pp., illus. in color. $0.60.* The abundance of game, fur animals, and fishes aided the pioneers and settlers in establishing themselves in the new land. And as successive waves of new immigrants swept the continent, much of the eastern forested region and the continental grasslands disappeared before the ax and the plow. The farming and cattle industries and the need for timber changed the landscape and living environment for many kinds of wildlife. Many species adapted to the landscapes and flourished; others diminished; some became extinct. Legislation to prohibit the wanton destruction of wildlife was passed in 1900, 1929, 1937, and 1950. Small game and big game now abound in National Forests and National Grasslands; these areas have helped to save the habitat of rare and endangered birds, animals, reptiles, amphibians, and fishes. A list and some colored photographs of these rare and endangered species appear in the back of the book.

Regulation of Flood Hazard Areas to Reduce Flood Losses. *1971. U.S. Water Resources Council Vol. 1, Pts. I-IV. 578 pp. $2.50.* Report, developed under the auspices of the Water Resources Council with the cooperation of a number of agencies, organizations, and individuals, deals with the regulation of land and water areas by state and local government to minimize flood losses and presents draft statutes and local ordinances for regulation of land uses in riverine and coastal flood hazard areas.

Bureau of Mines Research Programs on Recycling and Disposal of Mineral-, Metal-, and Energy-Based Solid Wastes. By Charles B. Kenahan and Einar P. Flint. *[1971]. U.S. Dept. of the Interior Inf. Circ. 8529. 53 pp., illus.* Summary of research on extracting mineral, metal, and energy values from urban refuse; upgrading and recycling automotive and related ferrous and nonferrous scrap; utilizing and stabilizing mine, mill, and smelter wastes; and recovering and reusing values from industrial waste products. Accompanied by an extensive bibliography of related publications.

USDAHL-70 Model of Watershed Hydrology. By H. N. Holtan and N. C. Lopez. *1971. USDA Tech. Bull. 1435. 84 pp., illus. $0.75.* The hydrologic model presented here is the beginning of an effort to express watershed hydrology as a continuum. Designed to serve the purposes of agricultural watershed engineering, the mathematical model is a series of empiricisms selected to provide a mathematical continuum from ridgetop to watershed outlet in terms of input information readily available to the analyst.

Trees of the Forest, Their Beauty and Use. *Rev. 1971. USDA PA 613. 24 pp., illus. $0.25.* The story of growing trees and timber in the 154 National Forests in the United States.

Your Environment: Air, Air Pollution and Weather. By Collins M. Henson. *1972. The Interstate Printers and Publishers, Danville, Ill. $4.95.* The purpose of this book is clear: to provide young people with an understanding of the element most necessary to man's survival—the air he breathes. Written specifically for junior high and beginning high school students, the book gives students an opportunity to begin with basic facts and proceed through complex processes, thus building a knowledgeable background in the area of air, weather, and man's use and misuse of his environment. Some of the subjects covered are air pressure, air and its parts, weather, wind belts, weather makers, thunderstorms, precipitation, tornadoes and hurricanes, cyclones, weather symbols, and man and the weather.

Water Well Manual. By Ulric P. Gibson and Rexford D. Singer. *1972. Premier Press, Berkeley, Calif. (P.O. Box 4428). Illus. $5.50.* The book covers the fundamentals of the occurrence and movement of ground water; the location, design, construction, and maintenance of water wells; pumping equipment; and sanitary protection of ground-water supplies.

Chemical Composition of Native Grasses in Central Oklahoma from 1947 to 1962. By George R. Waller, R. D. Morrison, and A. B. Nelson. *1972. Oklahoma State University, Agricultural Experiment Station Bull. B-697. 14 pp., illus.* Monthly samples from each of four species of predominant native tall grasses (big bluestem, little bluestem, indiangrass, and switchgrass) obtained during a 15-year period were chemically analyzed, and the major constituents important to the nutrition of beef cattle subsisting year-long on native range were determined. This publication reports a summary of the results.

Fact Book of U.S. Agriculture. By Glenn White. *1972. USDA Misc. Pub. 1063. 87 pp. $0.45.* Narrative summary of United States agriculture as a whole. Among the things discussed are farm production supplies, the farming operation, food marketing, agricultural services, and improving the rural social environment. The appendix includes summaries of state agriculture, a glossary, and selected references.

Here's What We Did, Community Leaders Tell About RC&D Projects. *USDA Soil Conservation Service. 1971. [36] pp., illus.* In this collection of articles, reprinted from the November and December 1971 issues of SOIL CONSERVATION, local leaders of resource conservation and development (RC&D) projects tell how community action has brought about better use and care of natural resources thereby improving the lives of people.

Vocational Instructional Materials for Agriculture Available From Federal Agencies. *1971. U.S. Government Printing Office, Supt. of Documents. [124] pp. $1.50.* Lists publications, reports, and periodicals on agricultural production, mechanics, products, and resources, and ornamental horticulture and forestry. It also lists related career education materials.

Guide for Interpreting Engineering Uses of Soils. *1971. USDA Soil Conservation Service. 87 pp., illus. $2.* Outlines the data to be included in the engineering section of soil surveys, shows methods for preparing and presenting engineering data in the engineering tables, and sets forth instructions for writing the text of the engineering section.

Foreign Bacterial and Fungus Diseases of Food, Forage, and Fiber Crops: An Annotated List. By Alice J. Watson. *1971. USDA Agr. Hbk. 418. 11 pp. $1.*

Preparing Herbarium Specimens of Vascular Plants. By C. Earle Smith, Jr. *1971. USDA Agr. Information Bull. 348. 29 pp., illus. $0.40.* This is a guide to preparing herbarium specimens, including hard-to-prepare specimens such as floating or submerged plants; plants with large parts; succulent aerophytes, mesophytes, and hydrophytes; plants with deliquescent or fragile flowers; plants of the pineapple and the palm families; bamboo plants; screwpines; and aborescent plants.

Agricultural Statistics, 1971. *U.S. Department of Agriculture. 639 pp. $2.75 (Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402).*

Effects of Management Practices on Johnsongrass for Hay Production. By A. E. Spooner, Will R. Jeffery, and Herbert J. Huneycutt. *1971. University of Arkansas Agr. Expt. Sta. Bull. 769 (Fayetteville). 19 pp., illus.* Three experiments were conducted at the Southwest Branch Experiment Station at Hope, Ark., to study the effects of physiological stage of maturity of johnsongrass when cut, and N, P, and K levels of fertilization on yield, chemical composition, and longevity of stand. This bulletin gives the results.

The Possible Dream, Resource Conservation and Development. By Wallace L. Anderson and Carolyn Johnston. *1972. Reprinted from "1971 Yearbook of Agriculture." 8 pp., illus.* Training, employment, increase in industry, flood prevention, sediment reduction, recreation—all the result of resource conservation and development.

Genetic and Cytological Studies With Camellia and Related Genera. By William L. Ackerman. *1971. USDA Tech. Bull. 1427. 115 pp., illus. $0.70.* This study was made to investigate the compatibility relationships of various Camellia species and species of related genera by obtaining interspecific and intergeneric hybrids and to determine the chromosome numbers of species and hybrids, the chromosome morphology of Camellia species where possible, and the breeding potential of interspecific and intergeneric hybrids. Twenty species were used as parents for interspecific crosses in Camellia, resulting in 459 hybrids from 106 combinations.

Meetings

May

7–14 Soil Stewardship Week
12 Family Camping Federation, American Camping Congress, Chicago, Ill.
14–17 Annual Northeast Wildlife Conference, Allenville, N.Y.
14–18 National Council of State Garden Clubs, Inc., Cleveland, Ohio
17–June 3 International Commission on Irrigation and Drainage, Varna, Bulgaria
18–19 American Concrete Pipe Association, Denver, Colo.
21–27 Urban Land Institute, 4th Annual Land Use Symposium, Toronto, Canada
23–25 Pollution Engineering and Equipment Exposition Conference, Chicago, Ill.
28–30 American Seed Trade Association, Portland, Oreg.

June

4–7 National Watershed Congress, San Diego, Calif.
5–16 United Nations Conference on the Human Environment, Stockholm, Sweden
8–12 General Federation of Women's Clubs, Denver, Colo.
13–18 American Water Works Association, Chicago, Ill.
14–16 Pollution Control Show and Conference, Toronto, Canada
18–22 Air Pollution Control Association, Miami Beach, Fla.
19–21 American Plywood Association, Gearhart, Oreg.
19–23 "Watershed Hydrology," National Symposium, Ft. Collins, Colo.
25–28 American Society of Landscape Architects, Philadelphia, Pa.
25–28 National Association of Counties, Washington, D.C.
25–30 National Education Association, Atlantic City, N.J.
27–30 American Society of Agricultural Engineers, Hot Springs, Ark.

July

2–7 National Environmental Health Association, N.Y., N.Y.
17–21 American Association of Nurserymen, Inc., Washington, D.C.
19–21 The Izaak Walton League of America, Chicago, Ill.
19–21 Forage Fertilization Symposium, Muscle Shoals, Ala.
23–27 National Association of Business and Professional Women, Atlantic City, N.J.
26–27 Great Plains Agricultural Council, Lincoln, Nebr.

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From the Administrator:

Helping dispose of animal wastes

A single steer produces about 75 pounds of manure each day. A dairy cow can produce even more.

Multiply that by 117.9 million head of dairy and beef cattle in the United States.

Add to that the waste from 18.4 million sheep and lambs, 62.9 million swine, and 900 million chickens, turkeys, and other fowl and you can get some idea of the immense amounts of animal wastes that must somehow be disposed of by American farmers and ranchers.

Much of this is recycled naturally on crop, range, and pasture land. But the growing concentration of animal production into large feedlots increases both the problem of waste disposal and the pollution potential involved in these concentrated amounts of animal wastes.

Many different people and agencies are testing new disposal and recycling methods. Our agency knows some of the answers, we are working to refine others, and we are continuing to look to the research agencies and farm and feedlot operators for new developments in this field.

The feedlot operators are well aware of the fact that they must manage their wastes to meet environmental quality standards, just as factories and communities must. Farm waste-management systems are becoming a part of more and more soil and water conservation plans. These systems are vital to the protection of the nation's soil, water, and air, and SCS intends to continue to give assistance to conservation districts in meeting the growing demand.

Why is SCS asked for help? I think it is because of our expertise in soil science, plant materials management, and on-land application of conservation practices. We are still in the pioneering stage, but it appears that the safest thing to do with animal wastes is to recycle them through soil and its plant cover. We certainly want to prevent discharge of pollutants from feedlots or liquid-waste holding ponds into streams or underground water supplies.

While alternative methods of waste disposal, such as composting, dehydration, and incineration are technically feasible, their use in the immediate future will be limited because of high cost and limited demand for products made from animal wastes.

In providing assistance, our people will have to recognize the limits of our role in the animal-waste field. SCS is not a regulatory agency. We are a service agency, a technical agency, with a responsibility for helping land users to solve problems of soil and water conservation, including those of pollution abatement. We will have to keep in mind the need to cooperate with other federal agencies having responsibilities in this field as well as with appropriate state and local agencies. Yet, the ultimate responsibility for adhering to conservation environmental standards falls to the land owner or operator himself.

Kenneth E. Grant

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U. S. Department of Agriculture / Soil Conservation Service / June 1972



SOIL conservation
June 1972, Vol. 37, No. 11

"Every day there is a new America—a changed America," says SCS Administrator Grant in his message this month. Hopefully, every day's changes will bring about an improved America. Warren Zitzmann, SCS urban planning specialist, in his article, tells us how planning affects change and how important it is that communities plan for the future. Also in this issue—Gerald Root discusses a "guidance planning system" that can test the adequacy of land-use policies before they are implemented.

COVER: An apartment complex in Rheem, California, *planned* and built to *stay* on the hillside. Precautions were taken to reduce the danger of landslide.

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We can help invent the future

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

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Community planning —who needs it?

by Warren T. Zitzmann
Urban planning specialist
Resource Development Division, SCS
Washington, D.C.

You and your neighbors need community planning—

• If you want your community to be a good place to live, to work, and to play—for people of all ages and all economic levels.

• If you want community decisions made on the basis of all the facts adequately analyzed and all opinions considered rather than on who is complaining the loudest.

• If you want community improvements designed to meet the needs of 5, 10, and 20 years into the future rather than those made just to solve today's crises.

• If you want your education, recreation, transportation, and utility programs coordinated so that they complement and strengthen each other rather than work at cross purposes.

• If you want your community to work cooperatively and effectively with its surrounding rural areas and neighboring communities, and with state and federal governments in attaining maximum results from financial and technical aid.

• If you want your tax monies to be budgeted so that costly capital improvements are anticipated up to 5 years in advance thus avoiding unexpected jumps in tax rates.

• If you want stable, steadily growing land values based on a confidence in consistent community development policies rather than wild speculation based on rumor or "inside" information that produces a boom or bust psychology.

• If you want a local government that is sensitive to people and their environment and responsive to the needs of this generation as well as the next.

Promises, promises

Community planning may promise a lot, and you may be properly skeptical. Too often community planning is given a weak beginning by just creating a planning commission without staff or adequate budget and then as the years drift by nothing much has changed. The reasons for a planning program failing to live up to advance promises are many. They include:

• People assume community planning is easy—that setting up a planning commission automatically insures effective planning. They fail to understand the commitment to "community self-discipline," which is involved.

• People assume it is highly technical and too complicated for the average citizen to

understand and therefore is a job to be turned over to outside experts.

• People underestimate the amount of plain hard work and the number of meetings necessary to establish full communication of ideas between leaders and laymen, technicians and politicians, private interests and public interests, and those who see only the quick buck and those who see the long haul.

• People lack the perseverance and patience to resolve all of the conflicting community goals in a democratic procedure, which is the essence of governmental planning in our society.

• People responsible for leading the planning program seldom fully understand what community planning is all about, so they settle for bits and pieces, such as a zoning ordinance or a recreation plan, thereby mistaking a set of wheels or an engine for a fully functioning whole automobile.

Characteristics of a complete planning program

First, planning must be recognized as a continuing function of government. It is not a one-shot job such as preparing a set of plans for a building. It would be just as foolish to hire a planner to prepare, in a few months, a comprehensive plan for the next 20 years, as it would be to hire an attorney to prepare, in a few months, all the laws the community would need for the next 20 years. Planning is properly described as a continuing process needing continuing professional help.

Second, a major and essential product of the planning process is a comprehensive plan. Many planning agencies have consumed much time and money in gathering and analyzing data on social, economic, and physical problems of the community. Most will even proceed to draft proposals for alternative solutions to these problems. But few have attained the significant goal of having a comprehensive plan officially adopted by the political body and the functional agencies that are in a position to carry out the plan. This means adoption by the elected officials and endorsement by the conservation district, school board, recreation board, highway department, utilities department, and other agencies having responsibilities for actually building various parts of our communities.

Third, the comprehensive plan, having been adopted, *must* be followed by a series of implementation activities. These include—

• Adopting a capital improvements program that sets priorities and financing arrangements for the planned improvements on a long-term schedule.

• Adopting a zoning ordinance that regulates the types and intensities of land use and development.

• Adopting subdivision regulations that set standards for the layout of new streets and lots and the required public improvements such as pavements, water and sewer facilities, and surface water drainage.

• Adopting regulations based on soils and water data, for flood-plain development, controlling erosion, ground-water recharge areas, and preserving prime agricultural land. These regulations can be incorporated in zoning, subdivision regulations, or both.

• Adopting an official map that designates lands to be preserved for future public use, such as schools, parks, and water-storage sites, until the public agency has the opportunity to act to acquire them.

• Adopting housing, building, and other codes that upgrade the quality of existing structures and set adequate standards for new construction.

• Creating an economic development agency with authority to acquire land and develop such facilities as an industrial park.

• Creating an open-space land agency with authority to acquire or obtain development easements on land needed for streambelt environmental corridors or other open-space areas.

Putting it all together

The key to a successful planning program is the community recognizing the importance of having both a continuing planning process and a comprehensive plan, which together produce the appropriate implementation activities. Emphasis is given to the continuing process in order to respond to the frequently heard criticism of the comprehensive plan as a static document that discourages change and flexibility. The comprehensive plan should be subject to re-evaluation and change at regular intervals, that is, whenever new or changed goals are materializing in the community, whenever there is a change of political leadership, or whenever new and unanticipated external forces exert themselves on the community. Planning is a dynamic process that responds as needs change, but responding to change does not lessen the need for the community to have an adopted comprehensive plan at any given time.

Can we afford to plan?

This question might better be put in another way—can we afford not to plan? Even the smallest of communities anticipating a population decline rather than growth has a need to plan, because change of any sort can always be modified to achieve better conditions if the community has a positive plan to meet its problems. The Boy Scout motto, "Be Prepared," is an endorsement of the planning concept. To illustrate, many small communities desperately need industry to provide new jobs. But frequently, when an industry approaches a community, inquiring about sites, it catches the community unprepared. Town leaders begin to scurry around to find out who has what to sell at what price and to determine if they can provide necessary streets, utilities, and other requirements. An industry being wooed by a hundred competing communities is not likely to wait several months for a community to come up with firm specific answers. The community with a well-planned and serviced industrial area is much more likely to be a successful competitor.

Making use of federal and state aid programs for all kinds of public facilities is another economic argument for planning. Governmental grants are increasingly made contingent on the availability of a comprehensive plan adopted by the local government. The obvious reason for this is to insure that individual grants will fit together in a coordinated system. Few local governments can afford to miss out on such financial aid. But even if no outside aid is involved, planning can still be worth the investment because local funds, both public and private, will go farther under a planning program.

Because of the cost, only a few communities of under 20,000 population have their own full-time professional planning staff. A workable solution for the smaller communities is to share a staff with neighboring communities, the county, or a multicounty planning agency. In some states the state planning agency will make a planner available on a contract basis. The important thing is to have continuing professional planning resources available.

Is planning only for urban areas?

The need for planning exists just as strongly at the township, county, or multicounty level as in cities. The governmental unit, regardless of how urbanized it is, has a limited supply of natural resources, such as land and water; human resources, meaning people and their health, education, and skills; and financial resources in both private and public capital. There are competing demands on these resources, and planning is the way to resolve these demands, resulting in both short-term and long-term benefits for the entire community.

The role of the conservation district

The conservation district can contribute significantly to the effectiveness of a planning program.

First, its data on the natural resources of the area can help in determining the effect of both urban and agricultural land uses on these resources. The district should participate in preparing the natural resources element of the comprehensive plan.

Second, the district can contribute technical help in both the drafting and the subsequent administration of those regulations dealing with characteristics of soil and water. Such considerations are increasingly a part of zoning and subdivision regulations, building codes, erosion and land-altering ordinances, and other regulatory devices.

Third, the district can contribute to a better public understanding and support of the planning program. The community leadership represented by the district is essential in stimulating and sustaining public support for the planning effort.

If at first you don't succeed

Literally thousands of planning agencies have been activated in the United States during the past 20 years. The passage of the Federal Comprehensive Planning Assistance Program in 1954 was a great stimulant to small community planning. Many planning efforts have floundered after a few years, however, because the community was inadequately prepared to understand and utilize a fully developed planning program.

Don't let an earlier failure or partial success discourage your community from another effort. If you have not yet tried a community planning program, it is never too late to start. The results can be well worth the effort—or to use a more popular phrase—try it, you'll like it. ♦

Mountain luck

by Ronald Arrendale
Conservation technician, SCS
Blairsville, Georgia

The solution to many problems requires money; the solution to some problems requires luck. The renovation of Blairsville Municipal Airport in Georgia was brought about by luck —and a lot of volunteer muscle.

The airport was constructed in 1963; it serves Union, Fannin, and Towns Counties, three heavily forested counties in the Georgia Appalachians.

The airport site had a serious erosion problem. Large gullies ran adjacent to the runway; the only vegetation was broomsage and a few scattered Virginia pines. Surface runoff, and particularly runoff from the asphalt runway, had played havoc with the adjacent backslopes.

Pilots were becoming concerned because the gullying had spread to the safety strip. A slight miscalculation in landing could have propelled a plane into a ditch. There was talk of closing the airport.

Back in 1968, Billy Tomlinson, the SCS district conservationist, and I were asked to look over the site. We saw that the erosion problem was critical.

The Blue Ridge Mountain Soil Conservation District recommended prompt action in stabilizing the area, but unfortunately the airport authority was somewhat lacking in loose cash. Running the airport, it seems, took up all the funds.

Two unrelated developments in 1969 changed the entire situation.

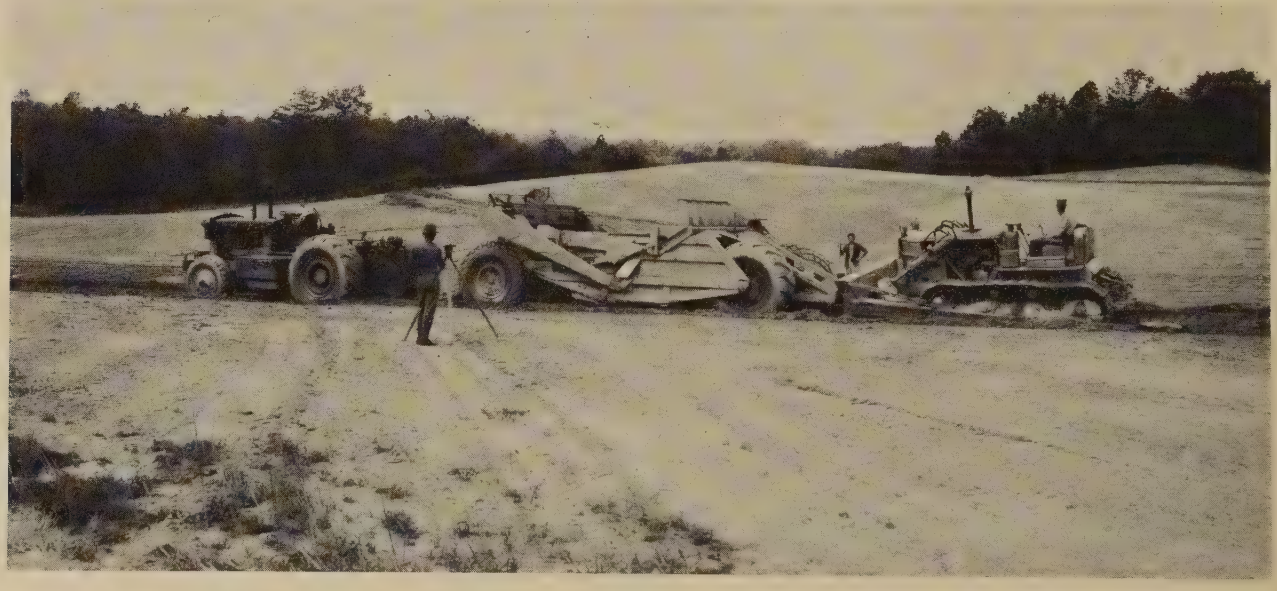
In the fall of 1969, the Beautification-Through-Conservation Awards Program was organized by the Georgia Association of Conservation Districts and the Electric Membership Corporation. This program brought about the formation of concerned citizens into the Union County Beautification Committee. The number one priority of the committee was the restoration of the airport.

At about the same time, at a Technical Action Panel meeting which I attended, a representative of the state employment agency announced that the agency was starting a "manpower development school" to train local men in operating heavy equipment. The school would be looking for a project in the area that could provide learning experience for the trainees. The project had to be big, so the school could bring all types of heavy equipment into play. And it had to be on public land.

The one insurmountable obstacle to stabilizing the airport had been the airport authority's inability to pay the cost of the heavy earthmoving equipment. Suddenly, there was the heavy equipment, just sitting there looking for a job to do for free.

A few months later, the school director looked over the airport site and decided it fitted his needs. The manpower school would do the work, he said, but the airport would have to pay for fuel for the equipment.

The airport was over the hump but not out of the woods. The fuel cost was estimated at $900. Where could Blairsville Airport



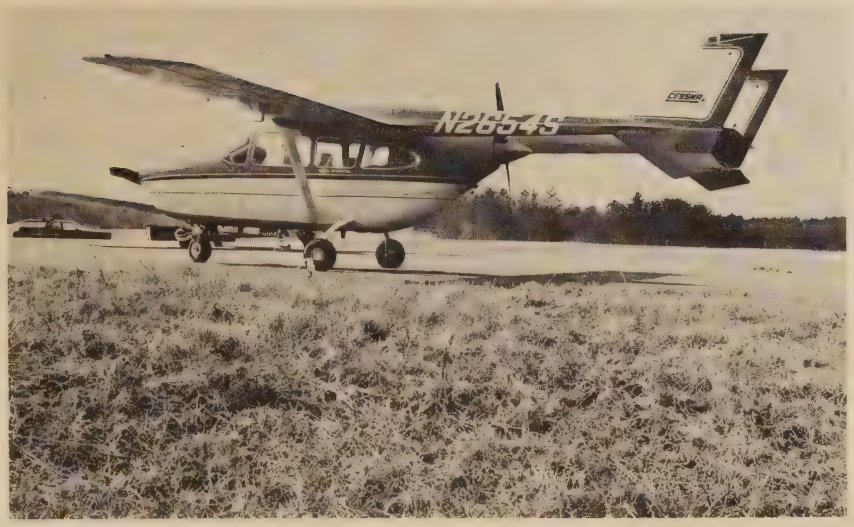
get that kind of money? And if the site were graded, it would have to be revegetated. Where would the seed come from, and the fertilizer?

The airport authority contacted the Blairsville city government. Would the city be willing to pay about $1,100 for fuel? The city was willing.

Steve Carver, a supervisor of the Blue Ridge Mountain Soil Conservation District, then contacted the Union County government. The county agreed to furnish enough lime, seed, and fertilizer to reseed the area following the grading, provided the airport authority could furnish the labor force.

Now the benefits from the training school were really in reach, but where could the airport get labor?

Meanwhile, our SCS soil scientist, C. L. McIntyre, had been called in to give soils information, and with this information Jerry Boling, the new district conservationist in Blairsville, had prepared a plan for revegetating the airport.



The Manpower Development Training School began its work at the airport in July 1970. The most seriously eroded areas, those adjacent to the safety strip, were graded and reshaped. Steep areas were gently sloped; waterways and water disposal areas were constructed to provide outlets for the runoff from the landing strip. The work was completed in October.

(Opposite page) The Manpower Development Training School helped Blairsville Municipal Airport solve its erosion problems.

(Above and below) Vegetation has stabilized the airport site and has stopped the gullying.



The city had helped; the county had helped; now the people were going to help. Robert L. Head, a member of the airport authority, worked with Robert W. Jones, a local businessman, in contacting people all over the county. People were asked to donate their time, their money, and their tractors to get the seed in the ground.

And they did. They prepared a seedbed and seeded the entire area in 1 week. The area was seeded to sericea lespedeza, crimson clover, and fescue. Rye was seeded as a nurse crop, to give quick cover for soil protection until the slower growing sericea and fescue took over.

By the spring of 1971, the cover was well established.

Sometimes I wonder why everybody was willing to help—to reach into their pockets, roll up their sleeves, and pitch in. I think the Beautification-Through - Conservation Awards Program had a lot to do with it. That program captured the imagination of all of us here. It showed us that if people anywhere want something good, rural development or environmental improvement or whatever, they're going to have to work for it. ♦

Natural resource planning for the 1980's

by Gerald W. Root
Assistant state resource conservationist, SCS
Harrisburg, Pennsylvania

In Bucks County, Pennsylvania, planners, natural resource technicians, and computer programers have teamed up to develop a "guidance planning system" that can test the adequacy of land-use policies before they are implemented. Thus far, the results look promising.

Development of the system began early in 1970 after the Bucks County Commissioners asked the County Planning Commission, the Natural Resources Division, and the Department of Parks and Recreation to prepare a natural resource plan for the county.

Recognizing that many plans become obsolete because they fail to treat change as a major factor, Franklin Wood, the Bucks County planning director, and his staff began looking for a new approach. After studying various planning systems, they selected a computerized guidance system because it offered three important advantages. First, because they spend less time in manipulating data, planners and decision makers have more time for analyzing issues and formulating policy. Second, a proposed policy could be pretested to avoid costly mistakes. Third, a plan could be started and updated as quickly as change takes place.

The system uses a computer to organize, store, and retrieve natural resource data by cells. Each cell represents a square, 1,000 feet on the ground, which covers 22.9 acres. A code locks each cell in the computer; a total of 17,862 cells are used to cover the county. For added accuracy, each cell is subdivided into ninths (2.55 acres).

Resource characteristics can be measured and recorded at four levels of detail for each cell. The simplest level is a *yes* or *no* situation in which a resource feature does or does not occur within a cell. When more detail is required, various digit values can be assigned.

For instance, if the location and description of streams is required, an "X" would be placed in any cell where a stream was located. To describe the stream in detail, "1" is used to indicate a swale, "2" to indicate a stream, "3" to indicate a river, and so on.

The third level can record population or other numeric data by cell, and a fourth level is used to determine the extent to which any cell is covered by a feature.

Using this cell system, tremendous volumes of resource data can be stored, organized, and retrieved as printout maps thus eliminating the need for preparing costly base maps. The location and description of all types of resource features—streams, lakes, rivers, swamps, marshes, watersheds, ground elevation, forest cover, historical and scenic features, soils, geologic strata, subdivisions, public utilities, land use, population, dwelling units, employment, and assessed evaluations—can be stored and printed out on the maps.

"It was no easy job to assemble and store the resource data we needed for planning," says Wood. "We used existing data wherever it was available and with good results.

"In putting together the soils data, district conservationist Merv Skiles, of the Soil Conservation Service, gave us the soil type and phase and the length and percent of slope. He also provided us with other soil characteristics for each soil type, including depth to water table, erodibility, flood hazard, drainage, and permeability. We cranked the Universal Soil Loss Equation into the computer to give us soil loss predictions for the different land uses," reports Wood.

The flexibility of map printouts is what makes the effort of gathering and storing these bits of data worthwhile, according to Wood's staff. Printout maps can be developed from the stored soils information for prime agricultural soils; wetland; cliffs and slopes; flood hazards; sources of topsoil, sand, stone, and gravel; soil permeability; and erodibility.

While developing the new system, Wood's staff prepared operational definitions for the critical natural features of the county. This is the first stage of policy formulation that can guide later planning activities. Generally, the lower the criteria, the broader the area of future consideration. For example, if prime agricultural soils are defined as those in

land capability class I, the printout map will identify few such areas in Bucks County. Hence, capability class I land would be a very critical resource in the county. But if the definition of prime agricultural soils is broadened to include land capability classes I, II, and III, far more areas would come under consideration, and the complexity of dealing with the resource would increase.

Evaluating and giving weights to critical natural features is the next step in plan development. Priorities for resource protection are established, and map overlays are used to combine resource features, resulting in a policy plan. This represents a major shift in emphasis from the traditional plan map to the policy plan. Under this system, use policies are based on the amount of resource protection needed to use, but not deplete, the resource base.

The computer is used in this step to weight all resource features in terms of their tolerance for various uses. Where the weighting of the various resource features is arbitrary, the computer may be used to test a variety of weights in experimental fashion. For example, to determine the natural areas that need the most protection, arbitrary weights for tolerance to use, ranging from 1 to 3, are assigned to each of the many individual resource features, such as erosion hazard, forest cover, flood hazard, ponds or lakes, historic or scenic sites, slope, and soil permeability. The higher the weighted value is for each feature, the more intolerant the resource feature is to certain uses.

The computer tabulates the weighted values for each resource by cell and then prints out a protection area map that indicates those areas which need extensive, moderate, or slight protection from use because of the intolerance of the resource base.

The last phase of plan development is establishing priorities and targets. Major resource use policies are tested by the computer. For example, one use policy might be to preserve land in capability classes I, II, and III for agriculture. A conflicting policy would be to protect areas where land values are low and where the most land can be preserved for each dollar spent. Both are valid planning concepts. By weighting and pretesting these with the computer, the areas where these policies can be implemented can be singled out and included in a plan.

Phase I, the critical natural resource feature, is complete. Phase II, the combining of individual resource feature overlays into a plan, is underway.

The same system has been used in park planning where natural features have been used to evaluate site suitability for specific recreation activities and the esthetic quality of the site. These were combined with such factors as accessibility to people, land value, distance from major existing facilities, ratio between supply and demand for specific facilities within an area, and probability of or threat from urban development. All are given weights and used to develop a plan map and a priority listing.

Franklin Wood and his staff are the first to admit that the system needs further refinement, but the computer has given them a planning flexibility that can deal with change. Perhaps this is the forerunner of natural resource planning of the 1980's. ♦



A sample computer printout map.



Pearl Ridge, a $50 million shopping center, forms a horseshoe around this watercress farm.

Growing watercress in a shopping center

by Otis M. Gryde
District conservationist, SCS
Honolulu, Hawaii

Farming in Hawaii generally moves out when the developer moves in.

Masaru Sumida's farm near Pearl Harbor, however, is staying where it is. Modern water and soil conservation practices have helped Sumida's 11-acre farm become a showplace. And the planner and developer of a $50 million shopping center, going up next to the farm, agreed that the farm would be an asset to the center.

The farm once was in rice, but in 1928 Sumida took it over and began to grow vegetables for the Honolulu market. Since World War II, he has concentrated on watercress.

In 1954, Sumida became a cooperator with the South Oahu Soil and Water Conservation District. Assisted by the district and the Soil Conservation Service, he has improved his irrigation and water management system. The SCS-designed water management plan has been incorporated into the farm's conservation plan.

Much of the 11 acres now in watercress was leveled and smoothed to allow for more efficient use of available water. The conservation leveling allows water to irrigate the watercress without causing erosion. The water continues on to Pearl Harbor in the same condition as when it came from the springs.

Sumida produces about 10 crops per year or about 45 tons of crops per week. Of this, about 10 tons per week is airshipped to the mainland. The rest goes to Honolulu markets and to military installations in the state.

"My farm probably is the only one surrounded by a shopping center," says Sumida. "Its green space will be a pleasing sight for shoppers." ♦

If you want a sediment-free lake . . .

by Mervin G. Danielson
State resource conservationist, SCS
Des Moines, Iowa

Armed with facts, figures, and strong feelings, citizen groups went to the Iowa Conservation Commission 3 years ago to protest the deteriorating condition of state-owned lakes.

The people were concerned about sediment building up in the lakes and about the high cost of removing it. The problem would not go away, they felt. And waiting would mean only worse water conditions and greater removal costs.

Some facts were known already. In 15 years, the capacity of Lake of Three Fires had been reduced by a third. Five years of dredging in North Twin Lake had cost $1 million. Siltation problems existed at Backbone, Darling, and Pine Lakes.

But was the situation as critical throughout Iowa? The response of the State Conservation Commission was to launch a study.

The commission requested help from the state's soil conservation districts and the Soil Conservation Service. It asked for resource inventories in every district that had a state-owned lake. Among other things, the inventory would show how much soil was leaving the area above the lake.

"When we know exactly where the sediment and other pollutants are coming from, we will be in a better position to stop them," says Everett Pierce, land management agent for the Iowa Conservation Commission. "We'd like to know, for example, what and how much is coming from roadsides, feedlots, and industrial or residential areas."

Twelve inventories are already finished. A dozen more should be ready a year from now.

Soil loss estimates are made by SCS. How much of the soil reaches the lakes is then determined by area engineers and the state watershed planning party.

The inventory also spells out land uses in the area under study, land treatment measures required for lake protection, kinds of wildlife and wildlife habitat, cost estimates for needed conservation practices, and an evaluation of the urgency of the sediment-reducing measures.

"In addition to the inventory," says Pierce, "in some lakes we're taking actual measurements of the silt with an electric depthometer. We think all this will give us a basis for planning the all-around protection of our lakes."

For the past few years, the commission has cost-shared conservation measures to protect the lakes from silt. Pierce feels this is a needed boost and hopes the Iowa Legislature continues to provide funds.

Another positive step came with action by the Legislature requiring conservation treatment on 75 percent of a lake's watershed.

It is also now the Iowa Conservation Commission's policy to withhold lake dredging until a lake's watershed is treated to prevent further siltation.

"Our lakes can be protected from siltation," says Pierce, "but it takes money and cooperation. I think people are realizing this and are ready to help." ♦



Dredging is not an inexpensive operation, Iowa Conservation Commission officials agree. It costs about $0.50 a cubic yard.

Planning to put it all together

by Edward G. Konieczny
District conservationist, SCS
Pittsfield, Massachusetts

In Massachusetts, Berkshire Conservation District supervisors planted a $3,000 financial seed that has grown into a $20,000 asset—a conservation education center.

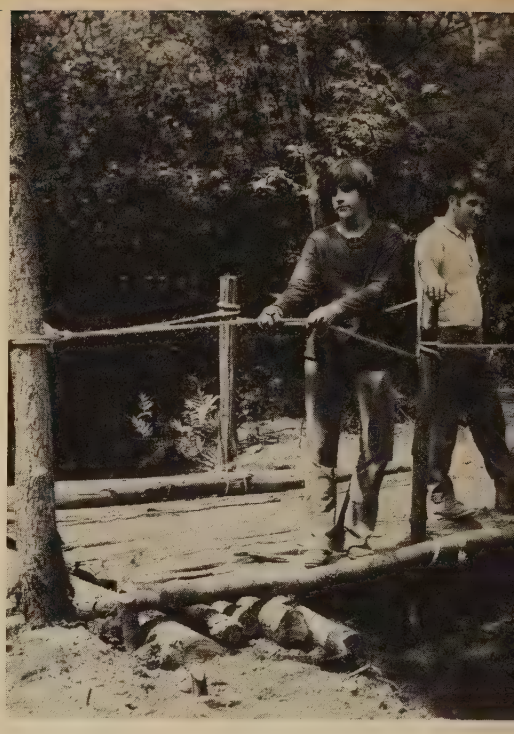
Mount Everett Regional School in Sheffield, a consolidated high school that serves the six rural towns of western Massachusetts' Southern Berkshire region, was faced with problems of properly utilizing its 70-acre site. The new school's administration turned to the Berkshire Conservation District and the Soil Conservation Service for resource planning help.

Among the suggestions offered was one that promised to enrich the curriculum while upgrading and protecting the property: involve students in resource planning through the development of a permanent conservation center on the school grounds.

School officials liked the idea. They would do what they could with their limited budget. For its part, the Berkshire Conservation District sought backing for the school project from the Massachusetts State Committee on Soil, Water, and Related Resources. The committee responded with a $3,000 grant.

The conservation district had thus demonstrated, as the entire project would, that knowing where to turn for help can be a crucial part of environmental improvement.

School officials, using a site plan developed with Soil Conservation Service advice, launched work on the outdoor education center in the summer of 1970, hiring student workers with funds from the school's allocation for its work-study program. These students cleared trees and brush from the future pond site and laid out the essentials of a proposed 840-foot nature trail. The wet areas along the trail were bridged with slab wood. In the fall, excavation of the 60- by 80- by 8-foot pond began. It was

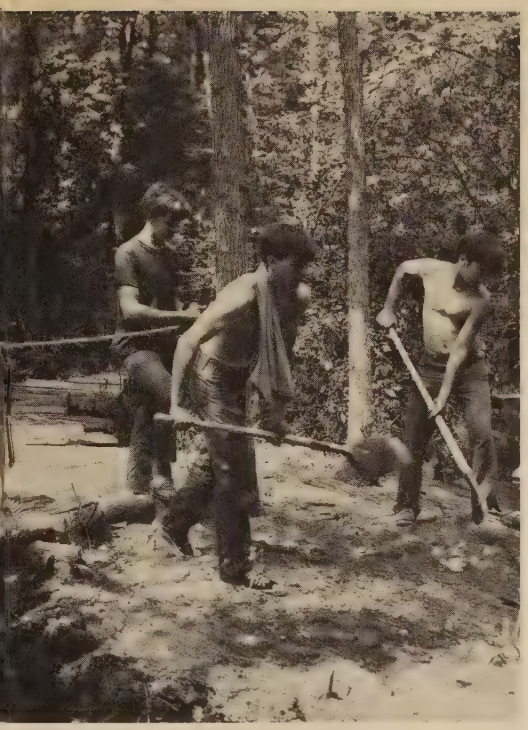








(Top) A rustic footbridge along the 840-foot nature trail. Tom Consolati, guidance counselor, directs the work.
(Left) Getting the banks along the pond ready for seeding.
(Above) The prefabricated sections were constructed in the school shop during the winter months.
(Right) Jim Shiminski, assistant principal and director of occupational education, helps with the assembly of the staging for the rafters and roofing.
(Extreme right) The conservation study center, a community project, nears completion.





completed early in the spring.

All of this effort, as well as the next year's campaign, was carried out under the direction of Tom Consolati, faculty adviser for work-study.

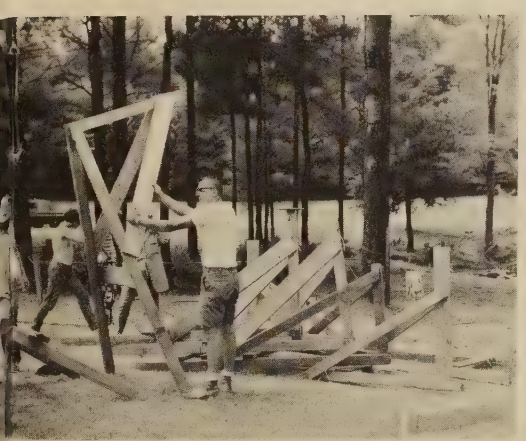
Through the good offices of the school and the conservation district, Jim Shiminski, assistant principal and director of occupational education and also the leader of the project, was successful in obtaining substantial backing elsewhere, in and outside the community. For example, part of the funds for the summer work force came through a grant from the Berkshire County Neighborhood Youth Corps. Moreover, Title I funds, under the Elementary and Secondary Education Act, were applied to offset a part of the adult supervision costs of the summer program. And the young workers used tools supplied by the school district, slab wood donated by a local sawmill operator, and building materials purchased with a $500 gift from a merchant in Berkshire County.

The second and final project phase—construction of a building for the nature center—got underway in the winter of 1970-71. The school's industrial arts shop class designed a 24- by 21-foot structure that was later prefabricated in the industrial shop and made ready for assembly on the outdoor site by work-study students in the summer. And, in fact, that summer the building did go up. Also, the still-raw pond banks were graded and seeded, and the nature trail was put into working—or, rather, studying—order.

Today, Mount Everett's nature study center and trail are being used intensively by high school science classes. Several fauna and flora identification projects are underway. Elementary school teachers are bringing their classes out to the pond and trail, too. And residents of Sheffield enjoy walking and bird watching along the trail.

The full value of this conservation education center is impossible to measure in dollars and cents. Who can accurately estimate, for example, even the informational value of a half-hour film about the project that the local television station made and that is being shown to town, civic, and social groups?

Still, the monetary value of the trail, pond, and building alone are now figured to be around $20,000. In view of the initial investment of $3,000, it seems fair to say that the cooperative effort of a school and conservation district along with other state, federal, and private donors has paid off handsomely—and the real dividends for the community will go on being paid for years to come. ♦





Save the valley, save the people

by Delbert L. Hansen
District conservationist, SCS
Heber City, Utah

For many Americans the need for two cars is being supplanted by the desire for two homes. People in cities along the Wasatch Front and from as far away as California, and even New York, are seeking a second home in beautiful Heber Valley.

Heber Valley affords four-season recreation: fishing in spring; hiking, golf, horseback riding in summer; hunting in the fall; and skiing in winter.

The valley, 40 miles east of Salt Lake City, is an area of 228,000 acres. Valley bottom lands take up 28,000 acres. Of the surrounding 200,000 mountainous acres, 48,000 acres are national forest land, 37,000 acres are state park land, and 115,000 acres are private rangeland.

There are two small cities in the valley—Heber City, with 3,200 people, and Midway, with 1,500 people—and three small towns. The total population of 6,000 has remained fairly constant in the last 10 years.

If the present influx continues, the population of the valley could grow to 200,000. Consulting planner, I. Dale Despain, believes this can happen unless sound guidelines for growth are developed.

The Wasatch Soil Conservation District Board, headed by Curtis Muir, recognized that the inherent beauty and natural resources of this area were attracting various kinds of developments. It was apparent that many of these developments could threaten the environmental quality of the area and create future problems.

The Wasatch County Commission, whose chairman is Russel Wall, was swamped with applications for developments. It decided to set up a county planning commission. Muir was appointed to this commission as the representative of the Wasatch Soil Conservation District.

Wall and Muir applied to the Soil Conservation Service and the state planning coordinator for help in developing a basic comprehensive or master plan with



Pastoral scenes like this may pass from Heber Valley in a few years if proposed development goes on.

sound goals and definite policies for directing future developments.

A meeting with representatives of all local organizations and federal and state agencies was the next step.

The Wasatch Soil Conservation District, county commissioners, and other local officials won the support of state and federal agencies, as well as of colleges and universities and the State Department of Public Instruction, in developing a basic "Resources Inventory and Guide."

Local organizations and supporting state organizations agreed on a cooperative approach that would result in communitywide environmental education.

As a first step, SCS completed two maps of the area and a soil survey. Map overlays are being made that will show soil limitations for various uses, including sewage disposal, foundation material in constructing low buildings and roads, and recreation developments.

Also being prepared along with the "Resources Inventory and Guide" is material for teaching environmental education in the Wasatch school system.

The consulting planner, Despain, is helping to organize a planning advisory council with committees to work on land use development, transportation, housing, and conservation renewal. The three commissioners and two mayors will each head one of the five committees. A soil conservation district supervisor will be a member of each committee.

About 500 residents of Heber Valley will make up the planning advisory committee. Total involvement is the objective.

The people of Heber Valley believe they can forestall haphazard development and protect the environmental quality they could have easily lost. They are glad that the threat was recognized in time. ♦

Can we do without soils information?

by Wilbur J. King

District conservationist, SCS
Birmingham, Alabama

In suburban Birmingham, Alabama, an expensive house stands on a prospect. Beside the house are a swimming pool and an elegant patio. The fence that once bordered the patio is now in ruins halfway down the bluff, half-buried in oozing, clayey mud. Landslides like the one that destroyed the fence will occur again and destroy the patio, then the pool, then the house.

The owner wants to save his house and has asked his conservation district and SCS for help. But there is no practical way to stop the landslides, according to SCS soil scientist David Lewis. "This entire area is made up of layers of sandstone and shale that have a tendency to slip and slide," says Lewis. "There's a fault on top of the hill, and that whole mountain is moving down into the valley. Where you have two sandstone layers, they rub together and there's friction, even when they're wet. But that shale is composed of silt and clay, and when that gets wet, it's just like a lubricant."

To the north of this area lies Homewood—population, 24,000. Much of Homewood is on the flood plain of Shades Creek.

"In 1971 we had a 600 percent increase in construction over 1970," explains Homewood's director of Civil Defense, Marilyn W. Grubbs. "Twenty-two new businesses have come here in the past year. We are now the fifteenth largest city in Alabama.

"Our soil is the type that washes away very easily, and our creek is so undermined that its banks are continually collapsing. We now get such bad floods that every time it rains I begin to get calls for help at five in the morning. The floods of March 1970 were the worst so far. They brought us under the Federal Disaster Relief Act.

"After a rainstorm we spend a good deal of time cleaning out our ditches so they don't back up. But this activity doesn't solve anything, and where do we go for help?

"We're eligible for flood insurance, but flood insurance doesn't solve the problem either; it doesn't stop us from having to move out the people who are flooded."

Homewood, along with a host of other cities and towns, is part of expanding metropolitan Birmingham. Birmingham, a steel



What bad news is in store for this house?

town known to its inhabitants as the All America City and to others as the Pittsburgh of the South, is celebrating its 100th anniversary this year. Those 100 years have seen continual growth. Today Birmingham's metropolitan area extends into Jefferson, Shelby, and St. Clair Counties.

The clay soils and mountainous topography of the Southern Appalachians have somewhat restricted developers. But these natural limitations are sometimes ignored, and the results are developments such as the one in the landslide area and the one on the Shades Creek flood plain.

The SCS Jefferson County Work Unit is aware that dynamic metropolitan expansion, combined with the severe limitations of some soils, has placed them, as soil and water conservation specialists, in the mainstream of the area's land-use problems.

Their major task is working with groups and with planners. A good deal of time is spent with mayors—there are 34 in Jefferson County alone. SCS is making a major effort to provide soils information and interpretations not only to developers and other property owners but also to the decision makers who are planning Birmingham's future course.

One such man is William Bondarenko, acting director of the 6-county Birmingham Regional Planning Commission.

"When we started out on our regional comprehensive planning program, soil characteristics were a major part of our study," comments Bondarenko. "The bulk of the soils-related information dealt with topographic analysis, which helped identify potential building sites.

"Along with this kind of information, we need specific information that will pinpoint flooding. Such information would allow us to delineate sites susceptible to flooding and set them aside for special uses.

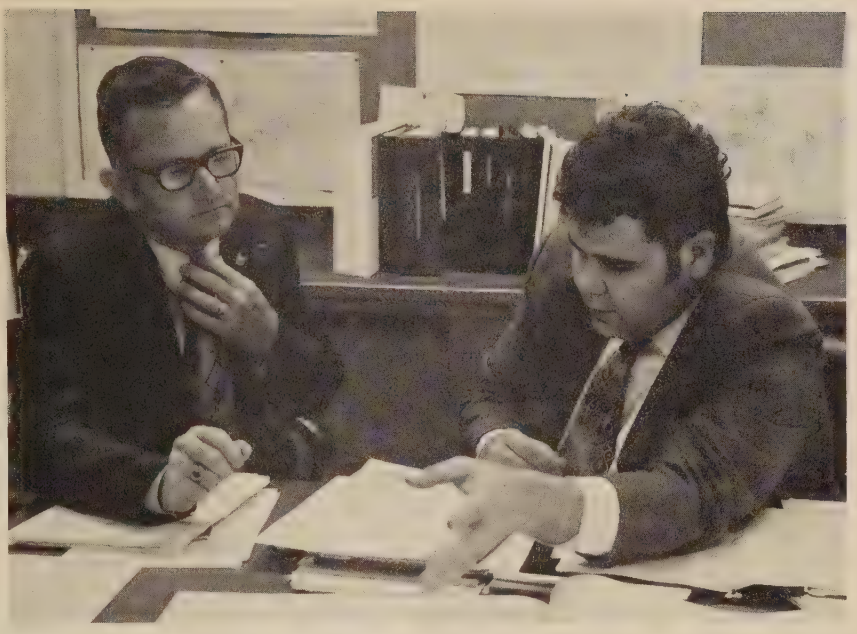
"As growth occurs, runoff increases almost geometrically; so as time goes by, flood plain identification becomes more necessary, especially in this urbanizing area.

"We can also use soils information in developing lakes or reservoirs for recreational use. We have enough water for municipal and industrial use, but we really lack water for recreational use.

"Regional planning is only one of our three functional divisions, the others being local planning and project development. We use soils data in our local planning program to deal with particular problems, such as sewer and water needs. In our evaluation of a particular piece of land, we use soil maps made by SCS soil scientists. In many cases, SCS information has been invaluable."

Perhaps the most thorough use of SCS information is by the Birmingham City Planning and Zoning Department.

William H. Moody, senior planner of the department, has summarized SCS soils interpretations according to severity of limitations. From this simplification, based on soils that have limitations for residences, businesses, and highways, a color-coded overlay that can be placed over the regular SCS maps has been designed.



William Moody, on the right, senior planner for the city of Birmingham, explains to the author how SCS soils information has been incorporated into the city's planning and zoning program.

Using the overlay, Moody or one of his fellow planners can identify land-use restrictions in any part of the city. If additional specifics are desired, the planners can return to the more detailed soils data.

The color-coded overlay is a helpful tool for the planning and zoning department, which must be able to quickly determine the soil hazards or limitations at a proposed development site within the city.

But the department also takes a long-range view of Birmingham. "We have a 20-year plan through 1990," reports Moody, "and 5-year programs within the plan. We're working on the suitability of the land, and this is where soil surveys will be used."

Moody doesn't feel that soil limitations are an immovable obstacle to development; in some cases the benefits of utilizing a location justify the costs of offsetting soil limitations. "Access is important," says Moody, "because if access is there, we might have the economics to overcome soil limitations. But if a decision is to be made, it should be made with full knowledge of the soil limitations."

Planners like Bondarenko and Moody, together with SCS soil scientists, know the value of soils information to an All America City like Birmingham. ♦



Game called—wet golf course.

conservation in action

Hunting preserve changed to Scout reservation

If officials of the Cherokee Area Council of the Boy Scouts of America have their way, Skymont Farm in Grundy County, Tennessee, will become one of the nation's top Boy Scout camps.

Skymont, once widely known for its fine quail and pheasant hunting, is at an elevation of 2,000 feet atop the Cumberland Plateau near Altamont, Tennessee. The location and the area's natural resources make the 2,700-acre facility an asset of almost unlimited value for furthering the scouting program in the Southeast.

The transition, however, from a hunting preserve to a Boy Scout camp does not occur overnight.

Following a detailed conservation plan, prepared with help from the Soil Conservation Service, Scout officials have started a remodeling program that will take about 20 years to complete. Using soil maps and woodland site index information furnished by SCS and the Grundy County Soil Conservation District, they have set aside about 800 acres of cleared land for planting to yellow poplar and loblolly pine. Cull hardwoods are to be removed and replaced with pine. Firebreaks and access roads are to be constructed as needed.

The reforestation program got underway last winter when Scouts from the Chattanooga and Grundy County area planted 50 acres of pine and yellow poplar. The Scouts had able supervision from Harvey Raper, the Scout camp ranger, and the local SCS district conservationist.

The long-range conservation plan also calls for enlarging one of the four lakes at Skymont, building two new lakes—a 30-acre lake and a 90-acre lake, and planting wildlife food plots.

Cost estimates for the 20-year remodeling effort run as high as $3.5 million.

Limited use of Skymont facilities began last year. Eventually, Skymont will be able to accommodate about 10,000 Scouts every year.

The old Skymont was famous for its upland game hunting, but Scout officials firmly believe that the new Skymont Scout Reservation, as a developer of youth, will be even more renowned.—LEE L. GRAHAM, *district conservationist, SCS, Tracy City, Tenn.* ♦



John Ward, Scout master from Fort Oglethorpe, Ga., Jesse Hawkins, Explorer adviser from Chattanooga, Tenn., a Boy Scout from Chattanooga, and Harvey Raper, camp ranger at Skymont, prepare to plant pines using the Grundy Soil Conservation District's tree planter.

Sullivan's bonanza

Sullivan County isn't number one in the state yet. But you'd best not say that in Sullivan County. Folks there have begun to suspect they have "the finest county in Indiana."

A few years ago, Sullivan County residents were more modest. They didn't have much choice: county land wasn't too valuable; county industry wasn't too intense. In short, the county's amenities were hard to find. For the last 50 years, the county's adventurous sons had been quietly packing up and leaving, headed for Chicago perhaps, or Indianapolis.

Then, Sullivan County got something that it had never had before—a lake. A prime lake. Although designed for flood control, the lake had potential for other purposes. The people of Sullivan County decided that using the lake for recreation would be a good investment. Sullivan County Park was built around the lake.

That was 2 years ago. Now the returns have come in, and come in, and come in. For the people of Sullivan County, the SCS-designed lake has proved to be a bonanza.

Dr. Noble H. Sevier, chairman of the Sullivan County Park Board (". . . ever since there has been a need for a park board," he said.), has put together an impressive list of benefits:

—Every day, evening, or weekend in summer, people are water skiing, fishing, boating, or swimming in Sullivan Lake.



Sullivan Lake has become a favorite recreation site in southern Indiana.

—The park and lake attracted 135,000 to 150,000 people to Sullivan County last year, and this year the figure is expected to be 175,000 to 200,000. Annual or seasonal passes to the park number about 1,100.

—The number of boats in the county has increased beyond all expectations, adding $42,510 to tax revenues.

—The number of travel trailers, campers, and motor homes also has soared. More and more people are camping in Sullivan Park and in the other camping sites in the county.

—The park and lake have increased land values in the surrounding area. Single lots are now selling for what 30 to 40 acres would have brought at prelake prices.

—The assessed evaluation of nearby Hamilton township alone has risen from $793,050 in 1964, the prelake period, to $1,492,200 in 1971.

—A 65-house subdivision being built near the lake will add substantially to the tax rolls.

—People in the county have developed a deep sense of pride in the county and their communities.

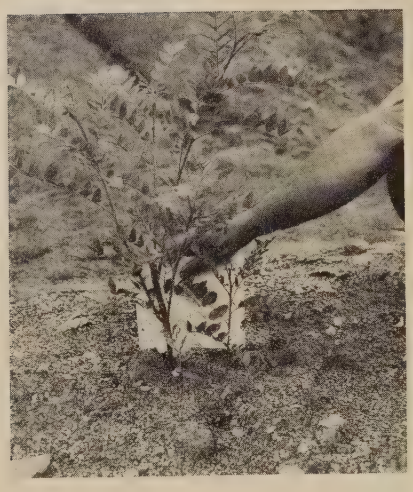
—New industry has come into the county, including two ladies garment industries, a modular home plant, and a packaging plant; the lumber and coal industries have expanded; and facilities in the banking and retail industries have been improved.

"See why we think we have the finest county in the state," remarks Sevier.—VINCENT J. PRICE, *Information Division, SCS, Washington, D.C.* ♦

Beauty in conservation

The value of conservation practices to the environment is well known. In the eyes of many, conservation also means beautification. Some conservation practices are particularly pleasing to the eye. Stripcropping, for example, not only can heal erosion scars but can add a touch of beauty to the landscape.

Stripcropping is perhaps the most widely used method of erosion control on Pennsylvania's farmlands. More than a million acres of contour strips have been established in the state in the past 36 years.



(Left) 'Arnot' bristly locust shows much promise as a plant that can help revegetate strip-mined areas. This 2-foot plant on acid mine waste produced a sucker 3 months after it was planted.

These strips, by keeping the soil in place, prevent silt from polluting streams. Clear, rippling streams are becoming increasingly scarce in Pennsylvania. To the thousands of trout fishermen who so eagerly take to the waters each spring, clear streams are a real treat.

Stripcropping in Pennsylvania got nationwide exposure a few years ago when a photograph of Stone Valley watershed—a valley of contour strips in Northumberland County—was selected to represent Pennsylvania in the "America the Beautiful" lithograph series.

In the last few years, the Soil Conservation Service has been active in critical-area planting, that is, planting suitable grasses, shrubs, and trees on severely eroded areas, especially acid mine spoil areas in the coal-mining regions. To date, about 25,000 acres have been reclaimed.

The beautification associated with these projects is obvious. In Pennsylvania alone, strip mining has left thousands of acres bare, eroded, and unsightly. Because the acid soils and high surface temperatures associated with most strip-mine refuse hinder natural reclamation of the land, SCS is continually searching for new and better plants that will withstand these conditions.

Promising plants such as 'Arnot' bristly locust, recently released by the SCS Plant Materials Center at Big Flats, New York, are used each spring to establish a vegetative cover on mine spoil areas. It is hoped that eventually lush fields of grass and dense stands of locust will cover the barren mine spoils.

Bare, unsightly roadbanks also are getting attention in the state. In both the Penn-Soil RC&D Project area of Erie, Crawford, Venango, and Mercer Counties and the Endless Mountains RC&D Project area of Tioga, Susquehanna, Bradford, Wyoming, and Sullivan Counties, planting roadbanks is a joint program between the RC&D project sponsors and the local townships. RC&D funds provide the plant materials, and the township provides the help to seed the banks. The banks are seeded with mixtures of birdsfoot trefoil, crownvetch, and fescue. Mercer County is also planting crabapple, forsythia, and hemlock where visibility is not a problem.

According to Dick Crowley, district conservationist in Mercer County, the roadbank seeding program has cut down on siltation tremendously and has helped beautify the area as well.

SCS conservation practices are not planned for beautification, but beauty is often an extra benefit. Farm ponds, flood-control lakes, tree plantations, flowering wildlife shrubs, and even the wildlife are features of the Pennsylvania countryside created or protected by the work of SCS.

Is there anyone to dispute that there is beauty in conservation? —CHARLES GENTRY, *resource conservationist, SCS, Somerset, Pennsylvania.* ♦

Environmental protection at Walker Field

Question: Has interagency review of environmental impact statements resulted in greater environmental protection?

Answer: "Yes," says Gus Byrom, manager of Walker Field, the airport at Grand Junction, Colorado.

Early in 1971, Gus Byrom informed the Soil Conservation Service office in Grand Junction that he had received a detailed request from the Environmental Protection Agency for an impact

statement on a large planned runway extension. The request alerted him to plan ahead to offset negative effects of the earthmoving operation.

The $2.5 million runway improvement was designed to meet requirements of the largest of today's jet liners. Because it involved stripping the vegetation from, and reshaping, a wide area, the airport manager asked for SCS recommendations on erosion control and revegetation.

The now-operational 3,000-foot extension of the main runway entailed moving about 2 million cubic yards of earth from an 80-acre borrow area into a 22-foot fill. The fill was then surfaced with 22 inches of asphalt.

Byrom met several times with SCS conservationists to discuss needed seedings and other measures for the borrow area. It was decided that the original Fruita sandy loam topsoil was to be stockpiled for later backfilling as a 4-inch cover.

Recommended seedings were carried out by the airport manager in cooperation with SCS and the local soil conservation district. Climatically adapted grasses were used in the mixture: Siberian wheatgrass, 3 pounds pure live seed per acre; Indian ricegrass, 3 pounds pure live seed per acre; western wheatgrass, 2 pounds pure live seed per acre; and four-wing saltbush, half a pound pure live seed per acre.

Seedbed preparation, drilling, and planting were completed in the fall of 1971. A sprinkler irrigation system was set up and operated for about 15 days. Good precipitation since then has added more moisture, and today the grass is at least 3 inches high and growing.—CLAYTON SPEARS, *soil scientist, SCS, and* JOHN DIXON, *district conservationist (retired) SCS, Grand Junction, Colo.* ♦

Where town and country meet

Farmers and ranchers do work with town people for a better environment—at least in Kiowa, Colorado, they do.

This little town in Elbert County has had a sediment problem for many years. Sand, silt, and other debris have been washing down into the Kiowa Elementary School playground, preventing the establishment of a good grass cover and creating a dusty, eye-watering condition whenever the wind blows.

School officials didn't like it and neither did the ranchers who owned land above the school.

Bob Johnson, one of the concerned ranchers and a member of the Kiowa School Board, was aware of both sides of the problem and wanted something to be done. He and the other concerned ranchers decided to ask the town of Kiowa, the Kiowa School Board, and the Elbert County commissioners to join them in working out a solution.

They took the problem to the Kiowa Soil Conservation District, and through the district got SCS help in developing a conservation plan for the small watershed. The plan called for a series of four small dams with drawdown pipes to catch the major part of the sediment and retard water runoff. The dams would keep the playground and rangeland free of sand and silt and allow the ranchers to revegetate their eroded gullies.

One month after the project began, the dams were completed. The Rural Environmental Assistance Program paid $4,500 of the total cost. The town of Kiowa and the Kiowa School Board paid the greater part of the remaining $1,400.—H. LANE THURMAN, *soil conservationist, SCS, Kiowa, Colorado.* ♦

An expanded Universal Soil Loss Equation

The Universal Soil Loss Equation (USLE), the method for predicting soil loss by sheet and rill erosion on a given site under a given cropping management system is being expanded for wider use.

For 8 years SCS people have been using the equation to add quantitative heft to their anti-erosion efforts. Instead of telling an Illinois farmer, "If you do that, you are going to lose a lot of soil," district conservationists have been able to say, "If you

do that, you will probably lose 20 tons of soil to the acre."

But there are only so many situations in which the equation applies. A major factor in the equation is "rainfall erosivity." The lack of this factor eliminated the entire western United States from the equation's applicability, because meteorological data on which to base the rainfall erosivity factor were unavailable west of the Rockies.

Another part of the equation, the "C" factor or cropping management factor, had been worked out only for cropped land, including hayland and improved pasture but excluding permanent pasture, woodland, rangeland, and idle land. This limited USLE's applicability even in the 37 eastern states.

Recently the agencies that developed the original equation, the Agricultural Research Service, the Soil Conservation Service, and several state agricultural experiment stations, teamed up again to expand its applicability to other land uses and to the western states.

They have computed an interim rainfall erosivity factor for the West's nonorographic areas, that is, areas where rainfall possesses enough kinetic energy to cause soil erosion. In orographic areas, such as the "Palouse" in Washington and Oregon, much of the rain falls as drizzle. The major cause of erosion in these areas is runoff rather than intensive rains. The factor for these orographic regions should be available this fall.

The soil erodibility or "K" factor, is also needed in the West. Now that the rainfall erosivity factor is becoming available, "K" factors are being developed for the western states by SCS soil scientists in cooperation with SCS state and regional agronomists.

But what about the "C" factor? In November 1971, ARS and SCS established the cover factors for undisturbed land. For example, for woodland, variables within the "C" factor include tree canopy, forest litter, and underbrush.

After the values of this factor were agreed upon, a final review was made by SCS agricultural engineer R. C. Barnes, Jr., SCS sedimentation geologist John Holeman, and SCS agronomist Joseph Turelle, working with project leader Walter H. Wischmeier of ARS. The information will be given a broader review and then will be made available to all state offices.

Not only will the expanded soil-loss equation provide another tool for making sheet and rill erosion estimates for SCS work in watershed projects, river basin studies, and RC&D projects, but it will soon be available to such diverse land owners and operators as California farmers, Colorado ranchers, Maine foresters, and suburban developers in the West.—VINCENT J. PRICE, *Information Division, SCS, Washington, D.C.* ♦

All it took was a phone call

The city of West New York, located on the New Jersey side of the Hudson River in densely populated Hudson County, had not asked for technical assistance from any county, state, or federal agency in 27 years.

Then, in June 1971, Mayor Anthony M. DeFino placed a call to the office of the Northeast Jersey Soil Conservation District. He asked for help in managing severe problems of drainage and soil erosion at two of the city's recreation parks, one of them a stadium where greats of the old Negro National League, like Josh Gibson and Roy Campanella, once played. The new municipal government had been in office only 3 weeks when the request was made.

Part of the urban tangle, West New York has few parks and little open space. What it has amounts to approximately 10 acres. Its 60,000 people are crowded into an area less than a square mile in size. By federal standards, more than half the population lives in poverty.

The Soil Conservation Service, assisting the conservation district, conducted onsite studies of Miller Stadium and Memorial Park and prepared specific recommendations for action.

For Miller Stadium, these included the installation of underground drains, some minor land grading, sodding, and seeding. For Memorial Park, several diversions as well as seeding were recommended.

The Miller Stadium drainage and grading work is now complete. With funds already allocated by the city, all recommended conservation treatment measures should soon be in place.

Mayor DeFino had expected the upgrading of the park and stadium to cost tens of thousands of dollars. In fact, a total outlay of several thousand is all that has been required to implement the SCS-backed conservation plan and restore to the residents of West New York their potentially excellent recreation facilities.—ELMER F. SAUER, *district conservationist, SCS, Morristown, New Jersey.* ♦

We can help invent the future

Every day there is a new America—a changed America.

A community that lets each tomorrow just happen is left in a position of having to react to changes that catch it by surprise. And surprises can be unpleasant.

Hundreds of communities are no longer satisfied with that approach and have begun to plan their future. The results vary widely, and of course surprises still come. But carefully planned and conceived things *get done*. A community can achieve much of what its residents want in the years to come.

The first requirement of planning is to get started!

The second is to put some effort into planning. It must be more than setting up a planning commission and expecting it to do all the work with bargain-basement support.

The third is to recognize planning as a continuing function of government at all levels. Plans are not an end product. They must not only be developed, adopted, and implemented by the people but also be re-evaluated and changed as the community, its surroundings, its people, and its ideas change.

The fourth is to think full circle. Planning for one or a few community needs in isolation —bits and pieces—may result in conflicts with other parts of the community, in unnecessary costs, and in a lot of missed opportunities. There is a limited supply of resources—natural, human, and financial—and competing demands for them. Beyond this we need to consider the first, second, third, and fourth effects of planned actions.

The fifth is to plan with natural resources in mind and not in spite of them. Man can manipulate soil and water and other parts of the environment in many ways to serve his aims—but sometimes the environment strikes back. Increased flooding, soil slippage, sediment pollution, and other ills too often are associated directly with community growth. Scarce resources such as prime farmland or plant and animal species or scenic areas may be needlessly usurped or destroyed.

Helping adapt community aims to the natural resources at hand is a growing role for the Soil Conservation Service and the local conservation districts through which its assistance is given.

SCS and districts can provide many useful natural resource facts. We don't stop there —we're involved in the process all the way from the use of resource facts in decisions about land uses, through implementation of plans, to conservation treatment of land in all uses.

Communities that want to make their own future have the responsibility to take stock of their own resources to do the planning job, involve their citizens fully in the process, and seek out all the sources of help available, such as SCS and conservation districts.

Likewise, SCS employees and conservation district leaders have a responsibility to take the initiative in pointing out to the communities in which they live and work the planning opportunities and environmental considerations that exist.

The result will be a better America for all of us.

Kenneth E. Grant

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SOIL conservation

U. S. Department of Agriculture / Soil Conservation Service / July 1972



SOIL
conservation
July 1972, Vol. 37, No. 12

Healthy livestock on healthy grass are a delight to any ranchman's eye—and that's what this issue of SOIL CONSERVATION is all about.

As illustrated in this month's articles, ranchmen from Texas to South Dakota are enthusiastic, and justly so, about the Great Plains Conservation Program, which has brought them noticeable improvement of plant cover, reduction of erosion and soil losses, and economic benefits. Read on, and judge for yourself.

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

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Revolution on the Plains

by Dale D. Allen
Public information officer, SCS
Temple, Texas

The Great Plains Conservation Program (GPCP) is helping to prove the value of a new grazing technique in Texas.

Increased production, reduced labor costs, easier handling of livestock, and marked grassland improvement are some of the benefits. If the technique continues to be as successful as early reports indicate, it may revolutionize grassland management in the Southwest.

The new technique is called the short-duration grazing system, the high intensity-low frequency grazing system, or the one-herd system.

The idea is to concentrate cattle in one pasture instead of in several. Then when the forage is grazed down, the herd is moved to the next pasture in the rotation. As a result, a pasture is intensively grazed a couple of months or so, then rested 6 to 10 months.

More than 50 ranchers are using the technique in Texas, mostly on land covered by GPCP contracts. H. R. Stasney of Albany was one of the first. Stasney is a cooperator with the Lower Clear Fork of the Brazos Soil and Water Conservation District in northwest central Texas.

"We have been amazed how this new technique has worked for us," Stasney said. "The way our grass has responded is almost unbelievable."

Thick, knee-high grass waved in the breeze as we drove through four vacant pastures. Suddenly, we topped a hill and came to a pasture literally full of cattle.

"There are 200 2-year-old heifers and 13 bulls in this 187-acre pasture," Stasney told us. "These heifers have been in here about 2 weeks. But the pasture was rested most of last year. That's why the grass is so thick."

Stasney said that the cattle would remain in the pasture for 30 to 60 days. But the amount of forage left in the pasture dictates when the cattle are moved, not the calendar.

Stasney began using the short-duration grazing technique in 1969 because it became difficult to defer newly seeded areas and maintain a 100-cow herd.

In 1968, Stasney signed a conservation cost-share contract under the Great Plains Conservation Program. Because the newly acquired ranch had only two pastures plus two cropland fields, cross-fencing was high on Stasney's priority list. So was control of mesquite and lotebush, which had invaded the grassland.

While the place was being cross-fenced, Stasney started controlling brush. In 1968, about 400 acres of tight bottom-land soils, heavily infested with lotebush and pricklypear cactus, were rootplowed and seeded to a mixture of 'El Reno' sideoats grama, 'King Ranch' bluestem, and green sprangletop. The following year, mesquite on about 1,000 acres of upland was tree-dozed and raked; then the same grass mixture was planted.

Scattered motts of trees were left for wildlife, shade, and natural beauty.

During the time Stasney was

controlling brush and planting grass, he was maintaining a base herd of 100 mother cows and trying to defer grazing on treated land. Forage sorghum on his two cropland fields, totaling 104 acres, helped ease the grazing pressure.

Lendon Parker, SCS district conservationist at Albany, helped Stasney get started on the short-duration grazing system.

"In 1969, we decided that the only way to rest the newly tree-dozed and rootplowed areas was to put all the cattle in the forage sorghum fields," Parker said. "The entire herd was put in one of the fields about mid-May and left there for a few weeks. Then it was moved to the other field. Calves were sold in July, but the cows were alternated between the fields all summer.

"By September 1, the sorghum was gone, but a 330-acre pasture rootplowed and seeded the previous year was ready to graze. We decided to keep the herd intact on this one pasture. This allowed Stasney to continue resting the other pastures."

The cattle grazed the 330-acre pasture for about 3 months, which included the September-October calving season. Then about December 1, the herd was moved to a 180-acre pasture treated the previous year.

This system of grazing continued into 1970. When calves born in 1969 under the system were sold in 1970, they were the heaviest ever sold off the ranch. They averaged 540 pounds.

That clinched it. The system was continued and is still in effect.

Late in 1971, Stasney replaced his 100-cow herd with 200 purebred Angus heifers bought in Nebraska.

Parker says one reason why the grazing technique works so well is that it permits the utilization of the less desirable grasses. Under normal selective grazing, cattle tend to eat only the more palatable plants. This not only punishes the desirable plants, but it also allows the less palatable ones to go largely untouched. Then when the choice grasses start regrowth, they have to compete for moisture and sunlight with plants that have been underutilized. This is a cycle that the short-duration system helps break.

Stasney claims his grass improves so rapidly because the better plants have less competition from the less desirable grasses.

"The real test of the system came late in 1970 and during the first 7 months of 1971 when a record-breaking drought struck," says Stasney.

"During the drought, my neighbors ran out of grass, and most of them had to sell part of their herd. My grass never showed any stress. It started raining in August, but I could have made it into the winter without rain."

Mack Wooldridge, Stasney's business manager, is also enthusiastic about the new grazing technique.

"Before, because we had only one small pasture and one large one, all covered with brush, it took eight cowboys a full day to round up the cattle. Now, one man can look after them. They are all in one pasture and are easy to feed and handle," says Wooldridge.

The six major pastures on the ranch range in size from 180 to 400 acres. A 39-acre trap doubles as a bull pasture, and a 94-acre utility pasture, which has been seeded to Selection 75 kleingrass, is saved mainly for weaning.

As we drove over the ranch, Wooldridge pointed out another advantage. Grass grew knee- to waist-high around every pond on the place—practically to the water's edge. There were no 30- to 40-acre beat-out areas around each pond as often occurs under traditional grazing systems.

District conservationist Parker pointed out two other advantages. "The new system can help break any parasite cycle that exists on a ranch," he said. "It could also reduce the number of bulls needed, especially if all the bulls are run with the herd.

"On the other hand, individual bulls could be bred to specific cows simply by breaking up the





(Opposite page) Two weeks before this photograph was taken, about 200 young cows and 13 bulls were removed from this 330-acre pasture after grazing there for 2 months. Pictured, left to right: H. R. Stasney, ranch owner, Lendon Parker, SCS district conservationist, and Mack Wooldridge, Stasney's business manager.
(Above) When the grass runs out on this pasture, the entire herd will be moved to another pasture.

herd into small, pasture-sized groups for a few months during breeding season. Then the entire herd could be regrouped."

Parker stressed repeatedly that this system is so flexible that it can fit almost any livestock operation. It doesn't matter if some of the pastures are two or three times as large as other ones in the system. You merely leave the cattle in a pasture until the grass is grazed down, then you move them. That's nature's way of grazing. The buffalo roamed in herds—they would graze an area, then move on.

"Ideally," says Parker, "you should have enough cattle in a pasture to harvest the grass in 60 days or less. That keeps the better grasses from being punished for excessive periods. You should record the dates of grazing so a pasture will not be scheduled for grazing at the same time each year."

Parker believes that a short-duration grazing system works best with six or more pastures. With fewer, the grazing periods would be too long and the rest periods too short to be effective.

Parker admits that the system is not a cure-all for overstocking. "Only properly stocked pastures should be considered for short-duration grazing," he says.

What impresses Stasney most about the system is the way it helps grass get better every year.

"When I first bought this place, my goal was to improve the grass to the point that it would carry 100 cows yearlong without having to feed hay. That goal has already been surpassed. Now, I believe I can make the place handle 200 cows or more. And running a cow and calf to 10 acres without having to feed them hay is practically unheard of in this part of the country."

Call it whatever you will, by any name, the technique works.

And it's probably here to stay. ♦



Welcome, well water

by Fred Trump
Information specialist, SCS
Salina, Kansas

In the Great Plains, where precipitation is scarce and erratic, underground water often makes the difference between success and failure for farmers and ranchers. Some places have underground water, and others don't.

The northern part of Logan County, in western Kansas, has abundant underground water. So does the Smoky Hill River valley, which crosses the county from west to east. But in the southern half of the county, you have to go deeper than 1,000 feet to find a reliable source of water.

Thus, at least half of Logan County has a water problem. A lot of water must be hauled to livestock. In some places, livestock must make frequent trips to the river for water. It's inevitable that they'll overgraze pasture close to the river and undergraze the higher ground.

Some Logan County farmers and ranchers have found another solution: pumping water to their rangeland and holding it in storage tanks. Some have chosen to use Rural Environmental Assistance Program cost-sharing provided through the Agricultural Stabilization and Conservation Service to obtain a dependable water supply, and others are using the Great Plains Conservation Program.

Lawrence Nieman, SCS district conservationist at Oakley, believes in the Great Plains Conservation Program.

To qualify for guaranteed cost-sharing under the program, landowners sign an agreement to carry out a total conservation program on their land over a period of 3 to 10 years.

As important as a water-storage system is, Nieman feels that a total conservation program is mighty important too. Proper grazing distribution on range and pastures as well as erosion-control measures on cropland should not be overlooked.

The first of two water-storage systems built last summer under

GPCP contracts was on the 2,359-acre ranch operated by Blair Kough and his son Mike. Their 200 head of cattle had been depending on three inadequate wells on the ranch, plus hauled water.

Now they are supplied by three, 2,800-gallon stock tanks, about a mile and a half apart, which are gravity-fed from a 6,000-gallon storage tank on the highest point of the ranch. The water is pumped 4 miles to the storage tank from a 20-foot-deep well in the river flood plain. The 1¼-inch pipe is buried about 4 feet deep.

The three stock tanks are 15 feet in diameter and have shut-off float valves and overflow pipe to prevent water waste and mudholes around the tanks.

At their own expense, the Koughs ran a lateral line to the house for home-water supply.

The second system in Logan County is similar to that on the Kough ranch but is unique in one respect: three ranchers shared equally in the cost of one complete water-storage system for all of their grasslands.

"The three ranchers happen to be brothers," says Nieman. "But the same sort of contract can be worked out with any neighbors and at considerable cost saving. Each would be sharing the same well, pump, line, and storage tank. Their only added cost would be extra laterals and tanks."

The Repshire brothers own three separate ranches totaling more than 2,800 acres. Formerly, their 300 head of cattle had to walk 2 miles a day one way and pass under a state highway to reach the river.

"To say that the pasture between the highway and the river was overgrazed is an understatement," comments DeWane Repshire.

The three brothers with help from SCS worked out a water-storage system that includes seven 12-foot watering tanks and more than 23,000 feet of pipeline. Their 5,200-gallon storage tank is located 210 feet above the river level. Easements to run the line beneath the state highway and a county road were no problem to obtain.

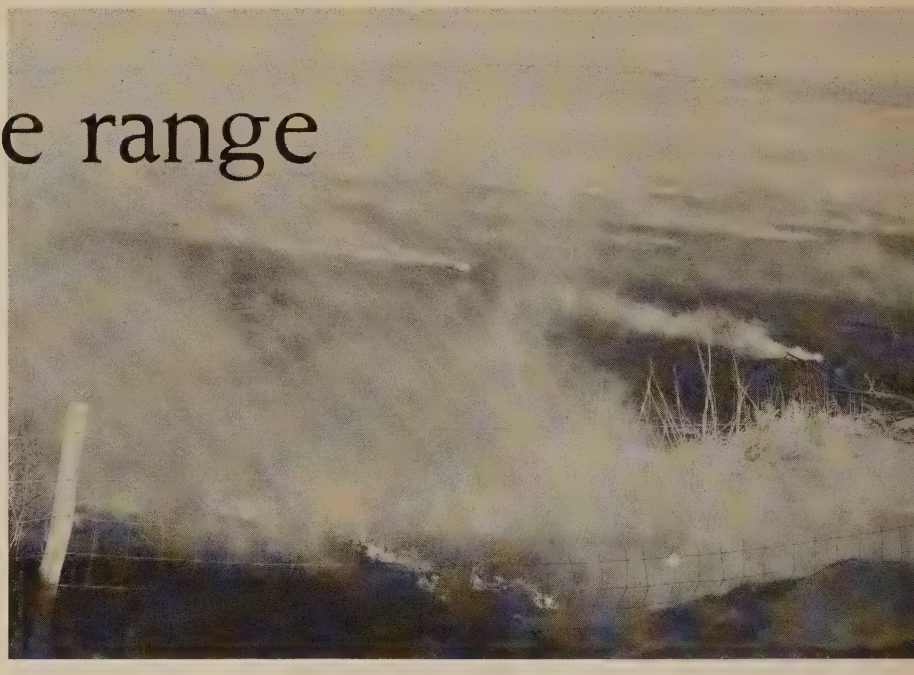
The Repshires paid the full cost of the storage tank and its concrete base, the pump, and pump fixtures. They also did a lot of the work themselves—like laying concrete, backfilling trenches, and installing the plumbing. GPCP shared in the cost of the well, the pipeline, and the tanks.

Plumbing on the plains, no doubt, will repay these Logan County ranchers many times over for their investment. ♦



By pooling their resources and with cost-sharing under the Great Plains Conservation Program, Harold, Lester, and DeWane Repshire brought a water-storage system to their rangeland in Logan County, Kansas. Lawrence Nieman, SCS district conservationist at Oakley, inspects the work in progress with the Repshire brothers. (Photograph courtesy of *The Farmer-Stockman*, Wichita, Kans.)

Fire on the range



On March 6, 1972, a range fire began near Mullen, in the Sandhills of Nebraska. Whipped along by a 40-mile-per-hour wind, the fire swept through prime rangeland in an 8-mile-wide swath. Ten thousand acres were consumed, then 20,000, then 50,000, then 100,000.

The fire swept towards the town of Thedford and the Nebraska National Forest, the largest manmade forest in the world.

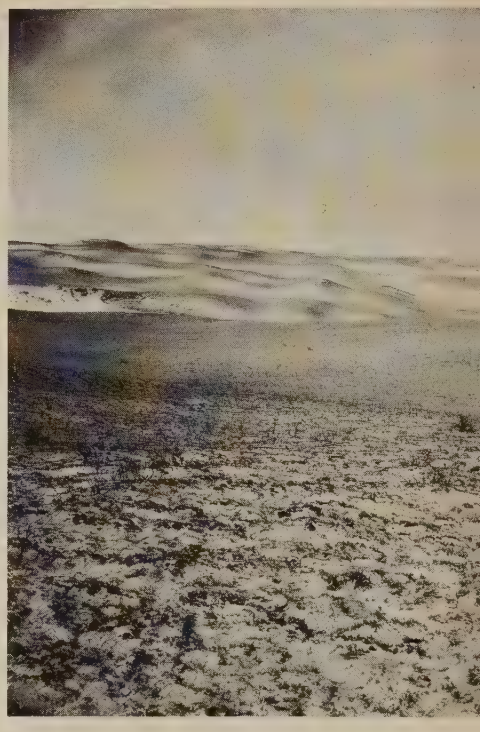
This forest was hit by a grass fire in 1965 and lost one-third of its trees. Now, again the forest was threatened. U.S. Highway 83 was the last major firebreak; if the fire could be kept on the west side of the highway, the forest would be out of danger.

But the fire crossed the highway. Seven hundred volunteer firefighters stood between the fire and the forest. They met the fire with shovels and wet gunnysacks; they held it back until water pumpers and U.S. Forest Service slurry trucks could put it out.

The setting for this fire was familiar to oldtimers in the Sandhills. The winter had been dry, and by March there was little snow cover. The grasses—sand bluestem, little bluestem, prairie sandreed, blue grama, and hairy grama—were brittle, tinder-dry. The March winds blew 40 to 50 miles per hour. A passing motorist threw out a cigarette, and the destruction began.

The final tally: 120,000 acres of prime rangeland burnt to a crisp. Livestock losses were serious; some ranchers lost 50 percent of their herds. Cattle that were alive but severely burned were shot. Hundreds of tons of hay, for the calving season, were lost. Many buildings were destroyed.

(Above) The effects of a carelessly tossed cigarette.
(Right) Fire swept over the rangeland in the foreground on March 6, 1972. Active blowing sandhills are in the background.



That same day in March, seven other range fires were burning in Nebraska. A fire near Ravenna burned about 13,000 acres. A fire northwest of Burwell cleared an area 10 miles long by 1 to 3 miles wide through rough range.

Other fires were reported throughout the Great Plains States.

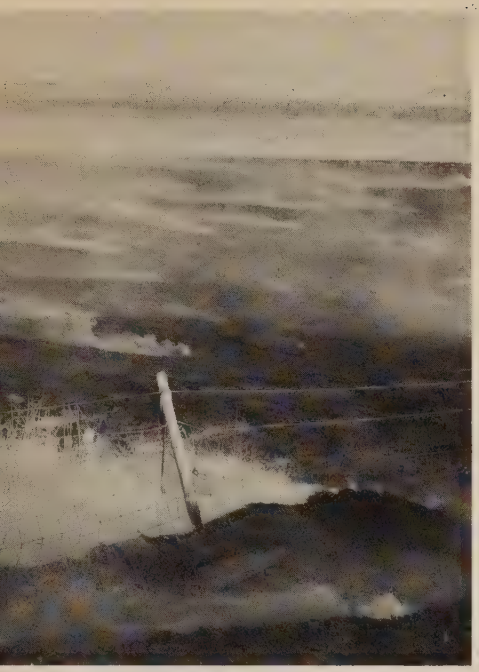
Fires can occur any time the grass is dry—generally from late fall to early spring.

Fire is a very real part of the ecology in this part of the country. The climate and environment favor grass, and grass encourages fire.

The primitive plainsmen, Plains Indians, and early ranchers periodically burned the grasslands to harvest wild game, to destroy insects, in warfare, or to increase summer gains on range steers.

Fire has had a great influence on the development of natural plant communities. It can have a temporary or permanent effect on the vegetation, depending on the soils, previous vegetation, time of burning, and management after the burn.

Ordinarily a grassland fire will consume everything above the ground. And with a strong wind





driving it on, it can gain tremendous speed.

The fire hazard sits squarely in the path of the Great Plains Conservation Program (GPCP). All the accomplishments a rancher has achieved through longtime GPCP assistance can be swept away in a short time.

The Sandhills take in 19,250 square miles of rolling rangeland

by Peter N. Jensen
State range conservationist, SCS
Lincoln, Nebraka

and native grassland. The dominant soils, those of the Valentine and Dunday series, vary in texture from loamy fine sand to fine sand. They are, as might be expected, extremely erodible. When an area is overgrazed, the soils start blowing. The result is blowouts.

Sandhill ranchers are well aware of the dangers of overgrazing. For years they have worked with their local soil and water conservation districts to establish and maintain vegetative cover.

The Great Plains Conservation Program was made to order for this area. Under GPCP contracts, the Soil Conservation Service helps ranchers to select proper land use and grazing management and to stabilize their rangeland. The program provides cost-share assistance with cross-fences, livestock water wells, windbreaks, range seeding, and blowout control. All of the Sandhills area is eligible for GPCP assistance.

But when the weather is dry and windy, the same grass cover that protects the rancher from blowouts becomes tinder-dry, and carelessness or a fluke accident can start a fire and destroy the work of years.

A fire has much the same effect as overgrazing—it strips the soil of cover and exposes it to the wind. The difference is that fire does a total job of destroying cover, and, unlike overgrazing, fire can't be prevented through a a management decision by the rancher.

A practical way to prevent all range fires still hasn't been found. There are numerous small fires in the Sandhills every year and occasional big ones. But though fires have not been prevented, their effects are being minimized by faster ways of putting them out and better ways of reclaiming burnt areas.

Throughout the Sandhills, all towns and cities have fire departments—fire equipment from 25 communities fought the Thedford blaze. Local ranchers have learned how to fight fires, and when a blaze starts, it can usually be put out in short order. Most ranchers have water tanks that are available for firefighting.

Reclamation is more difficult. A burned-out rancher hopes for immediate rain and high soil temperature to start grass growing and get quick soil protection. But even with the best circumstances, the rancher will have to keep his livestock off the burned areas for at least one growing season. Unless he rests these areas, the grass will fail to hold the soil.

The ranchers in the Thedford burn area got immediate assistance from the U.S. Department of Agriculture. SCS, working through the Grant-Hooker and the Blaine-Thomas Soil and Water Conservation Districts, is providing technical assistance. The Agricultural Stabilization and Conservation Service is cost-sharing deferred grazing and tree replacement. The Farmers Home Administration is making emergency loans mainly to replace livestock and buildings.

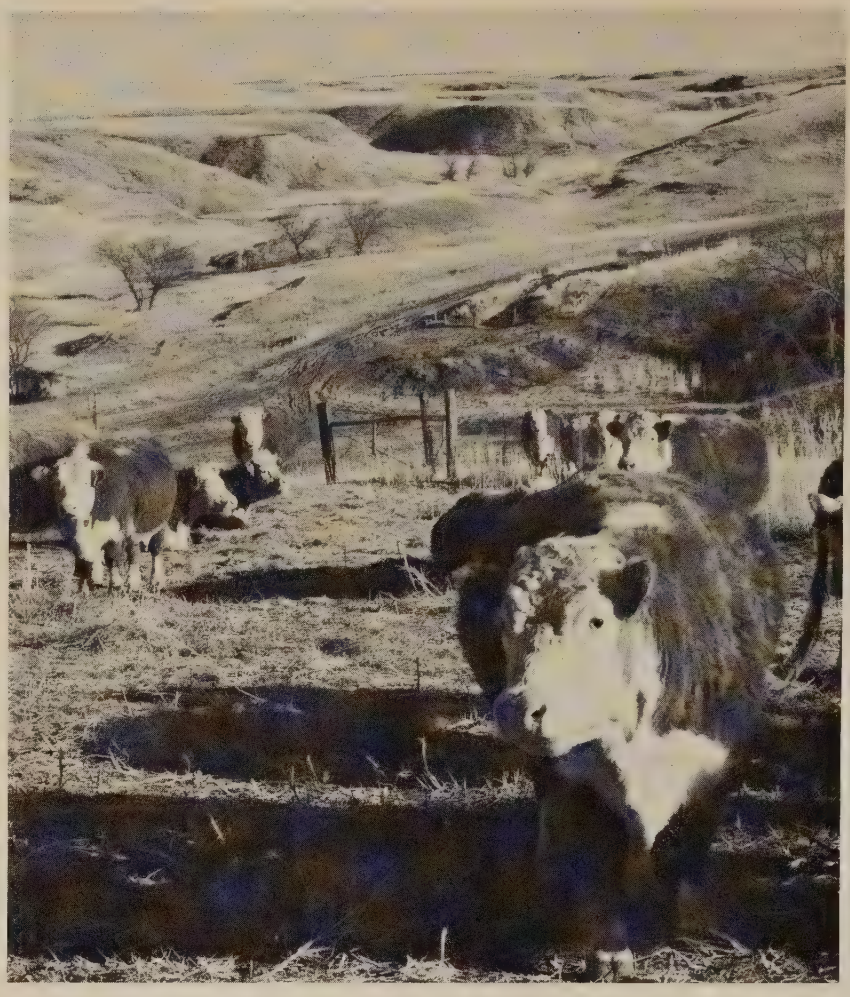
The burned-out areas will be rested for at least a growing season. Where blowouts have occurred, fencing, seeding, and mulching will be needed. Proper grazing management must be planned for years to come to build up the needed plant cover and restore the range.

Range fires still occur in the Sandhills of Nebraska, but local ranchers, by practicing modern range management and fire control, have achieved a range condition far better both economically and environmentally than that of a quarter century ago. ♦

Prescription for grass: lots of rest

by T. H. Pozarnsky
Range conservationist, SCS
Mobridge, South Dakota





Healthy range, healthy livestock.

"The Great Plains Conservation Program works," exclaims Blaine Drageset, a sheep and cattle rancher in Corson County, South Dakota. And as backup adds, "It's brought us higher weaning weights and more grass."

The 6,700-acre Drageset ranch includes 2,500 acres of leased range and nearly 1,400 acres of cropland. After buying the ranch in 1965, Drageset prepared a plan for its operation and used that as a basis for a GPCP contract with the Soil Conservation Service.

One of the main practices planned for and carried out is a system of range deferment. The objective is to increase the amount and vigor of the more productive grasses. This is accomplished by resting one-fourth of the grazing land, or about 1,300 acres each year. Grazing starts on pastures that had a full rest the year before. "This gives flexibility and a place to go with cattle in case of a dry year," Drageset explains.

"Since 1967 Agrifax Computer Services of the Production Credit Association has kept records of our operations. Adjusted weaning weights were 400 pounds per calf that year; these weights have increased each year since. In 1970 and 1971 weaning weights were almost 500 pounds per calf with a 92-percent calf crop. Our lamb weights were 95 pounds in 1970 with a lamb crop of 132 percent.

"No grain is fed, so grass reserves must be carefully controlled. We are increasing our livestock numbers very slowly. We never want to get ahead of the grass in either good or bad years. We graze the top half of the grass; what's left doesn't bother us. It's the amount produced and used that counts," says Drageset.

Drageset is a winner of the Greater South Dakota Soil and Moisture Achievement Program from the Corson County Conservation District. He has also been recognized by the Soil Conservation Society of America for "judicious management of natural vegetation." ♦

GPCP cooperative effort

by R. Steve Scheldt
Range conservationist, SCS
Sundance, Wyoming

Bluestem, wheatgrass, needlegrass—as high as a horse's withers.

Powder River country is rich in grass. And it is rich in the history and lore of the Sioux, the Cheyenne, and the Arapaho and of battles and bloodshed over claims to occupy and graze the lush range between the Big Horn Mountains and the Black Hills.

The Johnson County War, the last of the range wars, ended here with blood soaking the soil.

Drovers trailed thousands of cattle to the Montana and Wyoming territories through the Powder River country. The Texas, or Northern, Trail traversed the area on its route to Powderville, Fort Keogh, Miles-town, Mosby, the Judith Basin, Fort Benton, and points beyond.

It was along this trail that the Parks Land and Livestock Company was founded in 1907. Although by no means the largest in an area of cattle and sheep empires, its fences encircled 70,000 acres. Most of the land was in what became Crook and Campbell Counties in Wyoming; some was in what became Powder River County in Montana.

In May 1966, the Parks Company sold its holdings to two newly formed grazing associations. The Trail Creek Grazing Association, made up of 18 ranchers in need of more grazing land, bought 40,223 acres—the land in Campbell and Powder River Counties. The Rocky Point Grazing Association, with 19 members who also were cramped for land, bought 28,391 acres in Crook County.

A Great Plains Conservation Program (GPCP) contract had been in effect on the land since June 1959. The contract had been worked out by the Parks Company with the Soil Conservation Service furnishing guidance.

Conservation work completed at the time of sale involved $10,000 of federal cost-share funds and included wells, stock-water developments, range and pasture seedings, fencing, and an erosion-control structure.

When the grazing associations bought the property, they agreed to continue the practices called for in the GPCP contract. The Rocky Point Association took over the original contract with SCS and qualified for a contract extension of up to 10 years carrying the usual ceiling of $25,000 in federal cost-share funds. The Trail Creek Association entered into a new GPCP contract.

The Rocky Point Association discovered early that in addition to technical help from the Soil Conservation Service, which administers the Great Plains Conservation Program, it needed help and cooperation from other federal and state agencies.

The association moved cattle into its pastures along with large herds of sheep, and immediately it had problems. Two breeding dates for the cattle plus the grazing requirements for the sheep complicated the forage-management system. More watering places and about 6 miles of additional cross-fences were needed. But if the problem were to be adequately solved, some of the fencing had to cross public land under the Department of the Interior's Bureau of Land Management.

The association found BLM eager to cooperate. Fencing that crossed BLM land was installed according to BLM specifications.

As part of its brush-management program on 3,875 acres, the association left areas undisturbed to provide a habitat for antelope, deer, and sage grouse. The Wyoming Game and Fish Commission provided ready assistance.

One stock-water dam was enlarged and four stock-water pits were dug with GPCP cost-share funds. Two additional pits were dug with cost-share help from the Department of Agriculture's Agricultural Stabilization and Conservation Service. Five are to be added with Bureau of Land Management help.



A stock-water pond constructed for better grazing distribution. Such ponds provide water in many areas that otherwise could not be used for grazing.

Other federal cost-share funds will be used in installing an additional half-mile of fence, in managing sagebrush on 1,400 acres, and in establishing dryland pasture on 740 acres of rangeland.

Members of the Rocky Point Association are quick to agree that "cooperation is the name of the game." ♦

conservation in action

The 5,000th in Oklahoma

Sam Karber walked into the Soil Conservation Service office in Beaver, Oklahoma, last summer to get information about livestock lagoons. He walked out with an application to participate in the Great Plains Conservation Program. Little did he know of the fame that was to follow.

After completing a conservation plan for his 280-acre farm in northern Beaver County, Karber signed a GPCP contract. Not many days later he learned that he had signed the 5,000th contract in Oklahoma since the program began there in 1957.

The story of this landmark contract was carried by local, regional, and state news media, and Karber and his wife, Jan, received widespread attention.

Karber's contract calls for 27,000 feet of terraces, 7,600 feet of diversion terraces, an erosion-control dam, a disposal lagoon, 95 acres of cropland seeded to native grasses, and a conservation cropping system for the remainder of the cropland.

Local conservation districts provide leadership and direction for the Great Plains Conservation Program. In Oklahoma, GPCP contracts take in more than 4 million acres and obligate more than $14 million in cost-share funds for conservation work.

Beaver County leads the state with 464 contracts. These take in more than 500,000 acres and obligate more than $1 million in cost-share funds.

Karber and his wife grew up in Beaver County. They chose to buy a farm rather than live in the city. Both think that a farm is a better place to raise a family.

Karber says he made a smart move in inquiring about the Great Plains Conservation Program. He not only got the lagoon he needed but also a conservation program for his entire farm —and a little publicity.—JOHN T. RILEY, *district conservationist, SCS, Beaver, Oklahoma.* ♦

Sam Karber signs Oklahoma's 5,000th GPCP contract as his wife, Jan, and district conservationist John T. Riley look on.



Bringing back the sea of grass

In the late 1950's there were few ranchers in Kent County, Texas, who believed that a mesquite thicket could be transformed into a sea of grass. Since then the Great Plains Conservation Program has made believers out of the entire county.

Rangeland productivity in Kent County has been increased primarily through improved grazing management, which includes proper grazing use, deferred grazing, and better distribution of grazing.

In the late 1800's the first settlers in this plains area were welcomed by grass that was wagonbed high and stirrup deep. Mesquites were so scarce that firewood was hard to find.

As more ranchers moved into the county, they brought more cattle and barbed wire. They thought the sea of grass would last forever. But overgrazing, coupled with fire and drought, destroyed the grass and turned the prairie into an almost barren, brush-covered desert.

In 1957 the Conservation Needs Inventory for Kent County revealed a startling fact: Of the 481,786 acres of rangeland in

the county, 480,463 acres needed conservation treatment. About 347,000 acres needed brush control, and 61,700 acres needed range seeding before improvement of the grass cover could be expected. About 385,000 acres were being overgrazed.

Restoring this grassland to its once lush condition seemed impossible.

But in 1956 the U.S. Department of Agriculture began its Great Plains Conservation Program, and within a few years Kent County cooperators with the Duck Creek Soil and Water Conservation District had entered into 90 Great Plains Conservation Program contracts, covering 372,709 acres, or 66 percent of the county.

Conservation practices applied with cost-share assistance included 144,473 acres of brush control; 30,257 acres of range seeding, 2,700 acres of which was marginal cropland; 61 ponds; 60 livestock water wells; 274,028 feet of livestock water pipeline; and 334,298 feet of cross-fences. In addition, brush control and range seeding were carried out on many acres without cost-share help, and various grassland management practices were applied to the better grasses to help them respond to conservation practices.

Great Plains Conservation Program cost-share funds for Kent County have amounted to $2.6 million; farmers and ranchers have spent a similar amount.

The GPCP has been instrumental in proving that grassland restoration is feasible and practical. Kent County, Texas, welcomes back its sea of grass.—RHETT JOHNSON, *district conservationist, SCS, Jayton, Texas.* ♦

The grass will take care of you

"Take care of the grass, and the grass will take care of you," says Otto Uhrig, a cooperator of the Box Butte County Soil and Water Conservation District in the Nebraska panhandle.

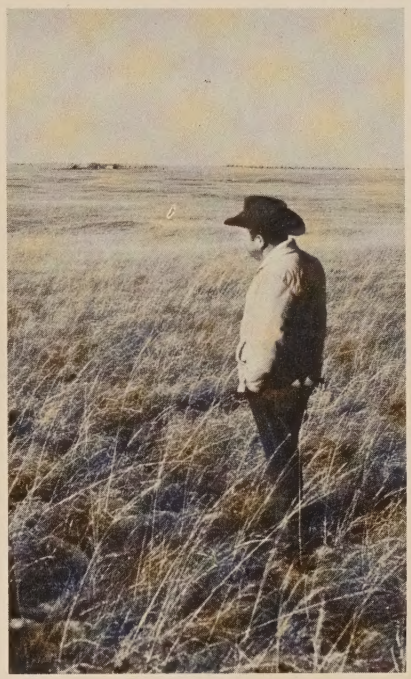
Uhrig's 3,200-acre ranch, which is 28 miles northwest of Alliance, clearly demonstrates the benefits of a planned grazing system.

He has had a Great Plains Conservation Program contract since 1967 and feels that he is reaching his goal of improved grazing efficiency through a combination of range conservation practices.

About 1,700 rods of cross-fencing and five livestock wells have been installed during the past 5 years to develop a system of deferred-rotation grazing. A two-section pasture, for example, was subdivided by cross-fences into three pastures of equal size.

Uhrig is quick to comment that tall grasses, such as prairie sandreed and sand bluestem, are replacing the short grasses. They are also pushing out the fringed sagewort.

Uhrig says, "I've even been able to increase my stocking rate to realize 10,000 additional pounds of beef annually while improving the condition of my pastures. Not only that but my labor needs have been reduced. Also, I keep fewer bulls now because the cows are more concentrated.



Otto Uhrig notes the greater uniformity of grazing that has resulted from the deferred-rotation grazing system on his Nebraska ranch.

"The extra forage that comes from a good deferred-rotation grazing system is insurance against the dry years," says Uhrig. "And the greater ground protection means less erosion."

The Great Plains Conservation Program is helping the Uhrig ranch reach maximum production and profits.—WARREN PEDEN, *range conservationist, SCS, Rushville, Nebr., and* EUGENE YOUNGMAN, *district conservationist, SCS, Alliance, Nebr.* ♦

Review

Books

Range Developments and Improvements. By John F. Valentine. *1971. Brigham Young University Press, Provo, Utah. 516 pp., illus. $10.95.*

Rangeland and related lands that produce natural pasturage make up about one-half of the total land area of the United States.

Range science and the application of scientific principles of management to this vast land area have reversed the trends of deterioration that resulted from early misunderstanding and mismanagement of the range resources by the first stockmen.

Today, rangeland managers and owners are treating rangeland as an ecosystem where physical, biological, and social factors and their interrelationships are considered in management decisions and systems.

Valentine's book is unique; it is the first comprehensive book-length treatment of this phase of range science. It fills a void by bringing together the vast amount of research data on manipulating range plants, mechanical land treatment, fertilization, rodent and insect control, and range facilities such as water developments, fences, and trails and walkways.

Valentine points out early in his book that range developments and improvements can be justified and economically used only when the proper grazing management techniques are used. Proper degrees of grazing use, planned grazing systems, seasonal use, range readiness, and other management techniques must be carefully considered for each rangeland system.

The author gives an extensive research bibliography for each chapter, and he has used many SCS photographs to illustrate his book.

Range Developments and Improvements is a badly needed reference for students, researchers, and range managers in general. It will take an important place alongside other rangeland text books and modern ecological studies of rangeland ecosystems.—Robert E. Williams, *Assistant to the Administrator for Environmental Development, SCS, Washington, D.C.*

New publications

Man, Nature, City, the Urban Ecosystem. *1971. U.S. Department of the Interior, National Park Service, Urban Ecology Series 1. [20] pp., illus. $0.20.* Discusses the function of cities, the city as a biological community, and "creating the urban ecosystem . . . and degrading it." This booklet is intended as a reminder to engineers, city planners, and architects that, while virtually any conditions can be engineered, the goal of their efforts should be establishing the most favorable conditions for man and that these conditions can best be achieved through ecological understanding and management.

Water Quality Criteria Data Book, Volume 3, Effects of Chemicals on Aquatic Life. By Battelle's Columbus Laboratories for the U.S. Environmental Protection Agency. *1971. [529] pp. $3.75.* Presents alphabetically by chemical original data from more than 500 technical publications concerning the specific effects of chemicals on individual species of aquatic biota. A *Species Index* facilitates search for information on the toxicity of chemicals to individual aquatic species. Discusses the details of major procedures in laboratory bioassay and field assessment of chemical toxicity in water; includes freshwater and marine procedures. About 1,000 references were utilized in preparing this report.

Methods of Predicting Solid Waste Characteristics. By Gail B. Boyd and Myron B. Hawkins. *1971. U.S. Environmental Protection Agency. 28 pp., illus. $0.40.* Reports on a study concerned with a waste prediction technique based on the hypothesis that the wastes discarded by a community derive primarily from the goods and materials consumed or used by that community (i.e., "inputs"); therefore, one can predict the amount and nature of these waste "outputs" by identifying what goods and materials constitute the community's inputs and by knowing how the community acts on these inputs.

An Engineering-Economic Study of Cooling Pond Performance. By Littleton Research and Engineering Corporation, Littleton, Mass., for the U.S. Environmental Protection Agency. *1970. 173 pp., illus. $1.50.* Presents an analytical procedure for predicting the steady state and transient temperatures of condenser cooling water obtained from a cooling pond. The predictions require knowledge of the monthly average climatic and power plant operating parameters. Measured water temperatures for several operating cooling ponds distributed over a wide region of the United States are compared to values predicted on the assumption of fully mixed ponds and slug flow ponds.

Nutrient Sources for Algae and Their Control. By Dr. George P. Fitzgerald for the U.S. Environmental Protection Agency. *1971. 77 pp., illus. $1.00.* Presents a critical evaluation of bioassays for nutrient availability made to define the conditions and limits under which each method can give meaningful results.

Proceedings, 1972 Annual Technical Conference. *1972. Sprinkler Irrigation Association (1000 Vermont Avenue, N.W., Washington, D.C. 20005). 72 pp. $8 to nonmembers.* Includes 12 articles on different aspects of sprinkler irrigation and the banquet address, "Some Ecological Implications of Irrigated Agriculture," by the president of New Mexico State University.

Effects of Feedlot Runoff on Water Quality of Impoundments. By William R. Duffer, R. Douglas Kreis, Curtis C. Harlin, Jr., and Robert S. Kerr for the U.S. Environmental Protection Agency. *1971. 53 pp., illus. $0.65.* Presents the results of a study to determine the effects of wastes transported in rainfall runoff from a beef cattle feedlot on the water quality of a small impoundment. Areas of consideration were chemical degradation of water quality and structural changes in the communities of aquatic organisms.

The Shape of Things to Come. *1971. Proceedings of the 26th annual meeting of the Soil Conservation Society of America, August 15-18, 1971, (Soil Conserv. Soc. of America, 7515 Northeast Ankeny Road, Ankeny, Iowa 50021). 262 pp., illus. $5.* Contains more than 60 papers that give current and timely information covering a diversified array of natural resource conservation disciplines. The subjects discussed include land-use planning, natural vegetation, urban-suburban conservation, water resources management, outdoor recreation, solid waste management, conservation research, surface mined area development, and trends in conservation and environmental quality. Among the papers are two by students on environmental education and phosphate pollution.

Eastern Forest Insects. By Whiteford L. Baker. *1972. USDA Misc. Publ. 1175. 642 pp., illus. $5.* Supersedes U.S. Department of Agriculture Miscellaneous Publication 657, *Insect Enemies of Eastern Forests.* The author, a retired USDA Forest Service entomologist, reviews the literature on eastern forest insects published since 1940, discusses insects occurring either entirely in those parts of the United States lying east of the 100th meridian or in both the eastern and western halves of the country, and gives the identification, distribution, host relationships, and life histories of insects occurring in eastern forests.

Finishing Yearling Steers on Pasture with Grain. By A. E. Spooner and Maurice L. Ray. *1972. University of Arkansas Agricultural Experiment Station Bull. 772. (Fayetteville).* Reviews the results of experiments, conducted from 1965 to 1970, in which steers were fed grain while on pasture. Data indicate that beef cattle producers can combine a program of wintering of weaned calves to 700 pounds or more by April with a program of full feeding on tall fescue-white clover pasture for 60 to 75 days to produce mostly choice 950- to 1,000-pound animals.

Catfish Processing . . . A Rising Southern Industry. Jesse R. Russell. *1972. USDA Economic Research Service Agr. Econ. Rpt. 224. 33 pp., illus.* Describes the catfish processing industry in nine southern states in 1970 and attempts to determine factors affecting the economic operation of the 16 plants surveyed.

Chlorinated Municipal Waste Toxicities to Rainbow Trout and Fathead Minnows. By Bureau of Water Management, Michigan Department of Natural Resources for the U.S. Environmental Protection Agency. *1971. 49 pp., illus. $0.60.* Reports the results of separate studies at four municipal wastewater treatment plants in Michigan. Ten rainbow trout and 10 fathead minnows, each previously acclimated to the river, were held for 96 hours in live boxes in the receiving stream above and below the outfalls of the plants.

Solid Waste Management: Abstracts and Excerpts from the Literature, Vols. 1 and 2. *1970. U.S. Dept. of Health, Education, and Welfare, Public Health Service Pub. 2038. [467] pp. $4.* An auxiliary report covering the literature search and data collecting activities carried on as a part of the major research project "Comprehensive Studies of Solid Waste Management" by the University of California.

Soil survey

George County, Mississippi. By Rex E. Davis. *1971. 58 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Desha County, Arkansas. By Hiram V. Gill, Fred C. Larance, Hardy Cloutier, and H. Wade Long. *1972. 48 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Gladwin County, Michigan. By Wesley Mettert. *1972. 112 pp., illus.; maps 4 inches to the mile (1:15,840).*

Yellowstone County, Montana. By James C. Meshnick, F. T. Miller, J. H. Smith, L. Gray, and W. C. Bourne. *1972. 133 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Dauphin County, Pennsylvania. By W. Merrill Kunkle, Garland R. Lipscomb, and Richmond Kinnard. *1972. 104 pp., illus.; maps 4 inches to the mile (1:15,840).*

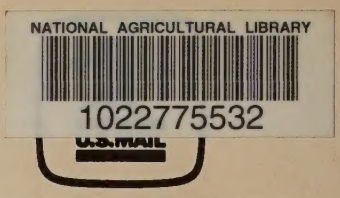
Thurston County, Nebraska. By Norman L. Slama, Dean W. DaMoude, Donald E. Kerl, and John J. Foreman. *1972. 64 pp., illus; maps 3.17 inches to the mile (1:20,000).*

Banks and Stephens Counties, Georgia. By George G. Brock. *1971. 78 pp., illus.; maps 4 inches to the mile (1:15,840).*

Utah County, Utah, Central Part. By John L. Swenson, Jr., Warren M. Archer, Karl M. Donaldson, Jungi J. Shiozaki, J. Howard Broderick, and Lowell Woodward. *1972. 161 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

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From the Administrator:

A model from the Plains

The Great Plains can be a pleasant place to live—millions of Americans choose to make their homes in that 10-state region. A sizable chunk of America's crops and livestock is produced there.

The Plains also can be a harsh place to live—when the summers get hotter and the winters colder and the winds stronger and the moisture scarcer than just about anywhere else.

This region of erratic climate, called "semiarid" in polite circles, has entered another cycle of dry years, like those of the 1930's and 1950's but with less property damage and human suffering.

Many landowners who took care of their land last year with technical and financial help through USDA conservation programs were able to come through the severe drought by making only a modest reduction in livestock numbers. Other landowners had to cut their herds back sharply.

This year, moisture and wind erosion vary widely throughout the region, but overall figures for the "blow season" just ended show that acreage of land damaged by wind erosion decreased by more than 50 percent compared with last year's figures. Some of the improvement can be attributed to the emergency tillage by landowners on 2.8 million acres and to other practices applied with the help of SCS and conservation districts through the Great Plains Conservation Program.

More than 3.2 million acres were in condition to blow. This, too, is less than half of last year's figure, but it indicates a need for greater effort to protect the land.

Farmers and ranchers need to prepare for whatever may be on tomorrow's weather map by avoiding overgrazing, disturbing the soil as little as possible during seedbed preparation and tillage operations, performing emergency tillage when needed, and working to insure adequate plant growth and effective crop residues. Nonfarm landowners have the same challenge to protect their property.

Whatever the weather map shows, practices under the Great Plains Conservation Program have proved their helpfulness in protecting against several environmental and social effects of wind erosion. The program's reliance on local leadership in determining priorities for assistance has proved sound.

In 1969 the Congress thought well enough of the Great Plains Conservation Program to extend it for 10 years. The Congress strengthened it by adding further specific provisions for assistance in control of agricultural pollutants, in conservation work on nonfarm property, and in practices for fish and wildlife.

Landowners, SCS conservationists, and district leaders have a challenge here to move ahead strongly on these new opportunities.

Kenneth E. Grant